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ABSTRACT

The terms of agreement of the Rural Water-Borne Disease Control Project called for a knowledge, attitudes, and practices (KAP) study relating to water and sanitation in rural Swaziland. The purpose of the study was to provide: (1) baseline data for the design of a national health education strategy aimed at reducing the incidence of water-borne diseases; (2) guidance for the sanitation and public health of the engineering components of the project; and (3) baseline data for any future evaluations or related research. The study is presented in eight sections: methodology; characteristics of respondents; water (water access, attitudes about water, boiling of water, water transport and storage, swimming/bathing); sanitation and hygiene (latrine coverage and characteristics, labor and motivation in latrine construction, personal hygiene, sanitation constraints); infant feeding practices (breast feeding, water and feeding, weaning age); knowledge of water- and sanitation-related disease (bilharzia, cholera, infant diarrhea, major health problems); analysis of data; and summary and recommendations. The last section focuses on health education targets and behavior change related to water, sanitation, hygiene, and infant nutrition. Strategies for health education and a general approach to health education are discussed. (Author/JN)

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RURAL WATER BORNE DISEASE CONTROL PROJECT

ACADEMY FOR EDUCATIONAL DEVELOPMENT, INC.

Under Contract No. 465-0087
with the United States Agency for International Development

A KNOWLEDGE, ATTITUDES, AND PRACTICES SURVEY OF WATER AND SANITATION IN SWAZILAND

Edward C. Green

October 1, 1982

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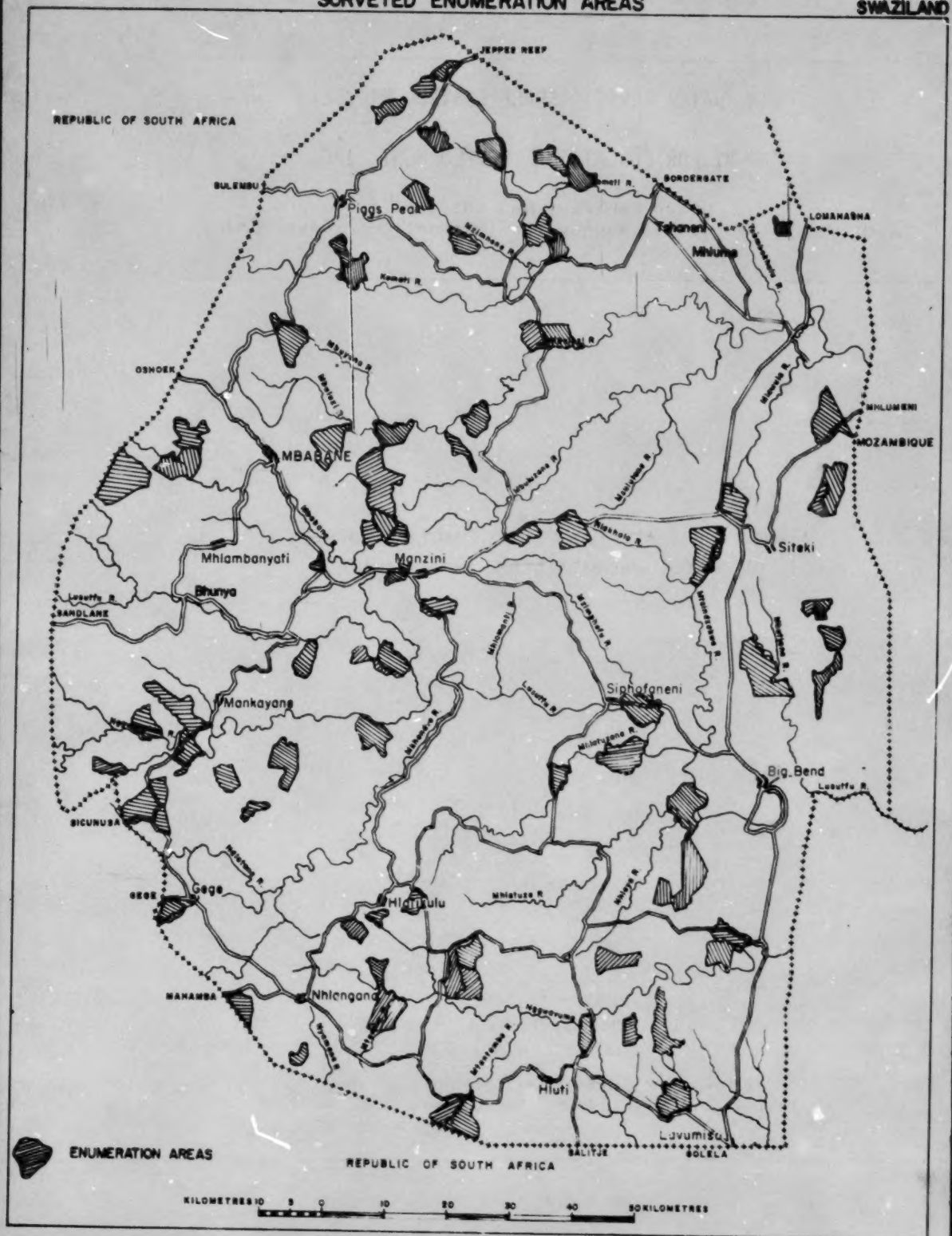
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The terms of agreement of the Rural Water-Borne Disease Control Project call for a Knowledge, Attitudes, and Practices (KAP) study relating to water and sanitation in rural Swaziland. It should be noted that the project was designed with unusual sensitivity to the importance of behavioral and sociocultural factors: instead of limiting social science input to the latter stages of project design and to an analysis based on little or no empirical research, such input was in this case to be based on extended empirical study and was intended to guide other components of the project during the first two years of implementation.

The intended purpose of the study was to: (1) provide baseline data for the design of a national health education strategy aimed at reducing the incidence of water-borne diseases, (2) provide guidance for the sanitation and public health engineering components of the project, (3) provide baseline data for any future evaluations or related research. To this must be added the more general project objectives of strengthening local social science research capability by providing training and the opportunity to participate in various aspects of survey research.

SECTION 1: METHODOLOGY

Fully aware of the difficulty in obtaining accurate or valid data through survey methods in rural Africa,[1] past survey/research efforts in Swaziland were reviewed in order to assess the suitability of an orthodox KAP study

[1] For an outline of these problems, cf. Ronald Cohen, "Warring Epistemologies: Quality and Quantity in African Research." in O'Barr, W., et al, (eds.) Survey Research in Africa: Its Applications and Limitations. Evanston: Northwestern University Press, 1973, pp. 36-47; also: James Brown, et al (eds.) Multi-Purpose Household Surveys in Developing Countries, Development Centre of the Organization for Economic Co-operation and Development, 1977, and J. Clelend, "A Critique of KAP Studies and Some Suggestions for Their Improvement," Studies in Family Planning 4(2), Feb. 1973, p. 42.

in the present context. Of greatest concern was whether or not rural Swazis would give candid replies--or any replies at all--to questions regarding toilet behavior, personal hygiene, or other intimate, highly personal activities.

Parallel Studies

After considerable review, discussion, and preliminary ethnographic fieldwork, it was decided that anthropological (or qualitative) research was needed in order to supplement, guide, and make sense of any survey (or quantitative) research effort. Accordingly, the KAP survey fieldwork was preceded by two studies that employed qualitative methods aimed at achieving high validity while necessarily sacrificing measurement capability. These were:

(1) A study of traditional medicine and healing, using some 50 traditional healers (tinyanga) as key informants and including limited participant-observation as a research technique. This is referred to as the traditional healer study in this report; and

(2) A knowledge and behavior study relating to water and sanitation, using rural health motivators (RHM's) as informants. This is referred to as the RHM study.

Most of the information resulting from the first study will appear in a separate report, given its very basic nature. On the other hand, much information obtained from the RHM study relates directly to the KAP survey and is reported along with the survey data. Because of this, more is included about the design and methods of the RHM study.

RHM Study

Rural health motivators are individuals, usually women, who are chosen by their communities--usually by hereditary leaders--to receive about 8 weeks of training in preventive health care at a regional clinic. After training, RHM's work amongst their neighbors promoting homestead sanitation, proper infant nutrition, and other health practices. The

first groups of RHM's were trained in 1977; there are currently 288 RHM's working on a part-time basis in Swaziland. There is a sprinkling of traditional midwives (babelekisi) and healers (tinyanga) in the cadre.

A sample of 42 rural health motivators (RHM's) were interviewed in 8 regional clinics which supervise RHM activities.[1] A flexible, open-ended questionnaire was used and translators assisted in most interviews. Standardized probing techniques were developed and used when answers seemed stereotyped. Since each RHM routinely visits approximately 40 homesteads, the interviews provided information based on nearly 1,680 rural homesteads. These homesteads may be regarded as reasonably representative of Swazi Nation Land[2] as a whole, since they are situated in the 4 geographic zones of Swaziland, and do not overlap with peri-urban or privately controlled areas.

Questions used in the RHM interviews concerned behavior, attitudes, and knowledge related to water, sanitation, personal hygiene, and infant feeding. Unlike the KAP homestead survey, which was based on self-reporting, the RHM survey was based on the reporting of other peoples' attitudes and behavior by knowledgeable individuals who were presumably sympathetic to public health goals and, by extension, to the aims of this study.

KAP Homestead Survey

The homestead survey was conducted between December 13, 1981 and January 10, 1982. A pre-test was carried out during November, 1981. Survey personnel included 28 interviewers,

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[1] Since interviews were completed for this study (by October 31, 1981), one more group of RHM's has been trained and another is being trained as of this writing, so that 10 groups will be operating by mid-1982.

[2] Swazi Nation Land (SNL) refers to that part of Swaziland held in trust by the King for use by the Swazi people. There are 822 EA's nationwide but only 568 EA's in SNL; the latter comprised the initial sample frame.

3 supervisor-interviewers, 5 drivers, and 2 supervisors. Most were recruited through the newly formed Social Science Research Unit (SSRU) of the University College of Swaziland, specifically: 18 interviewers, the 3 supervisor-interviewers (who were SSRU graduate research assistants), and one faculty supervisor. Ten interviewers were recruited from the Central Statistical Office; they had all worked previously on the Government's annual agricultural survey.

Questionnaire and Pre-test

Although based primarily on the needs of the project, question content and wording followed to some extent that of previous water and sanitation studies conducted in Africa and elsewhere, so that results would be comparable to other survey results. The questionnaire was pre-tested by the 3 graduate assistants with 45 rural respondents outside the areas selected for the survey; a total of 4 drafts were prepared and tested prior to acceptance of a final questionnaire for use in the study.

The last pre-tested revision was in siSwati. A linguist on the faculty of the University College of Swaziland translated the third draft into siSwati, then the entire group of interviewers and supervisors compared the English and siSwati versions, and revisions were made. For the record, the English version was modified to reflect a rather literal rendering of the actual siSwati used.

The final questionnaire included 69 questions of which 65 were pre-coded and 4 were open-ended. Of the 65 pre-coded questions, 23 provided for write-in options. Interviewers were also free to write in answers that did not conform to the available categories for any of the questions.

As a result of the pre-test, several questions were dropped because they elicited stereotyped or otherwise distorted answers, or in some cases, no answer at all. Therefore it was not possible to ask all the questions that would have been desirable. For example, in one question it was asked where people turned for help in cases of adult diarrhea.

Less than 1% of respondents indicated they consulted any type of traditional healer or another family member. Yet it is known from other evidence that a very substantial proportion of rural Swazis treat diarrhea at home or go to a traditional healer.

The Sample

A stratified cluster sample was used, based on data from the most recent census (1976). In the first stage, a sample of census enumeration areas (EA's) was derived by the Agricultural Survey Division of the Central Statistical Office to represent Swazi Nation Land (SNL). This sample consisted of 89 EA's, of which 24 were in the Highveld, 32 in the Middleveld, 25 in the Lowveld, and 8 in the Lubombo Plateau, reflecting population distribution in the 4 physiographic regions of Swaziland.[1]

In the second stage, specific homesteads were chosen from Central Statistical Office lists of homesteads covering the selected EA's. Using a table of random numbers, 5 sample homesteads and 2 alternative homesteads were chosen from each selected EA. During fieldwork, 5 and occasionally 6 homesteads were interviewed. A total of 455 questionnaires were completed or just under 1% of the estimated 50,000 homesteads in Swazi Nation Land. Given the cultural homogenity of this area and the subject matter of the survey, this was felt to be an adequate sample size.

It should be stressed that the sample may be regarded as representative of Swazi Nation Land, but not all of Swaziland, which includes urban and privately/corporately owned areas. This was intentional: the primary intended beneficiaries of the Rural Water-Borne Disease Control Project are rural Swazis.

[1]Eight of the EA's were repeats, since CSO used the "selection with replacement" technique in sampling. Thus only 81 different EA's were sampled. In repeat EA's, 10 rather than 5 homesteads were selected.

Sampling error was calculated at between 7-8% for the above procedure. Additional inaccuracies can also be introduced during coding, tabulation, editing, interviewing, analysis, or translation. However, comparison of data from this survey with results from the RHM and related surveys show significant parallels, therefore we can assume reasonably high reliability and validity of data.

Given the relative homogeneity of Swazi society, its lack of specialized roles, and its cohesive kin-group structure, it seemed best to regard the homestead (umuti) as the response unit for a survey of this sort.[1] The head of homestead, or other adult family member standing in for or approved by the head, was considered an appropriate spokesman. At the same time, for some questions, it was desirable to ask what the individual thought. In this way, associations with predictor variables could be analyzed.

Given the possibility of differences in response by age and sex, a balance was sought among these characteristics among respondents (see Section 2).

Fieldwork

As an inducement to cooperate with interviewers, each respondent was offered a cholera information packet, which included a packet of Oral Rehydration Salts. These were well received and probably helped achieve complete cooperation. Another factor was that fieldwork was conducted in the same enumeration areas as the annual agricultural survey. This meant that people and their chiefs were accustomed to interviewers.

The most time consuming, and therefore expensive, aspect of the survey was locating particular homesteads

[1] For the rationale behind regarding the kin-group or homestead as response units, cf. Max Drake, "Research Method or Culture-bound Technique? Pitfalls of Survey Research in Africa." in O'Barr, et al, op cit, pp. 63-66.

from a list. This often meant long drives or walks, and much asking of directions; and sometimes families had moved or no one was home. In the latter case, interviewers chose the next nearest homestead for conducting the interview.

One problem with the homestead lists was that census-takers often used a homestead head's "European" first name, such as Daniel, whereas the person was locally known by his more traditional name, such as Bheki. Therefore, sub-chiefs or others were sometimes employed as guides to assist in the location of homesteads.

Interviews usually took between 30-45 minutes to complete yet because of time spent locating homesteads, an average of only 2 (later $2\frac{1}{2}$) interviews could be completed per day by an interviewer. In retrospect, one might weigh the various costs incurred against the marginal benefits of using a probability sample. It may be that for a survey of this sort, designed to guide health policies and educational strategies, a systematic sample (i.e., choosing every 10th or 20th homestead in a pre-selected EA) would be adequate. Some of the time and money saved thereby could then go into measures to reduce response error.

Interviews were conducted between December 14 and January 10, with time out for seasonal holidays. Chiefs and their assistants had been notified of the survey by letters from their district commissioners and/or by public radio messages broadcast over a period of several days. However, chiefs were usually absent from their areas during the earlier part of fieldwork because of their participation in Incwala ceremonies. This meant that the usual visit to the local chief demanded by protocol could often be dispensed with (this was not planned). In all, chiefs, sub-chiefs, and (especially) people in the homesteads were very pleasant and cooperative.

The survey team moved as a group and covered all EA's which could be reached in a day within a general area. After covering the entire country in this way, small

groups were sent back to cover EA's that were missed or that had yielded fewer than 5 interviews.

It was not possible to reach homesteads in one selected EA (4301) in the extreme northeast, so an adjacent EA (4305) was substituted after consultation with the Central Statistical Office.

Problems in Fieldwork

Logistical and supervisory problems made it impossible to adequately monitor incoming questionnaires and discuss interviewing experiences on a daily basis. This meant that omissions or other questionnaire problems sometimes went undetected for several days. Fortunately, it was possible to rectify a number of problems later, although at greater cost.

Since most of the interviewers were students, it was planned that all fieldwork be completed during the Christmas holiday period. Having to accomplish a great deal of work in a relatively short period of time exacerbated the logistical and perhaps the supervisory problems. Future researchers in Swaziland ought to consider using fewer interviewers, supervising them more closely, and allowing a greater amount of time for fieldwork.

Data Processing

Key punchers from the Government Computer Centre punched the data directly from coded boxes along the right-hand margins of the completed questionnaires. Data was then analyzed by a private firm near Washington, D.C. using the Statistical Package for the Social Sciences (SPSS). The decision to analyze the data in the United States was based on the unavailability of a complete SPSS program in Swaziland and the need for rapid processing of data.

A description of analytic methods is presented in Section 7.

SECTION 2: CHARACTERISTICS OF THE RESPONDENTS

Of the 450 respondents, 67.5% were female and 32.5% were male. Although interviewers attempted to interview an equal number of males and females, men were often not present in the homestead at the time of visit. The resulting sex ratio of respondents probably reflects the de facto population of Swazi Nation Land quite accurately.

There were more male respondents in the Lowveld and Lubombo regions, where 39.9% and 44.7% respectively were males. 29.3% of Highveld respondents and 26.0% of Middleveld respondents were male.

The mean age of respondents was 38, and the various adult age categories were represented approximately equally: 101 were age 18-27, 87 were 28-37, 98 were 38-47, 89 were 45-57, 69 were over 57 and 6 were less than 17 (even though the protocol called for use of respondents over 16 only).

32.1% of respondents were head of homesteads (banumzama), and 86% of these heads were male. The mean number of residents in a homestead was 10.3; just over 50% of homesteads had between 7-12 residents. It is possible that two or more homesteads under one polygamous head were counted as a single homestead by some interviewers. This would skew the mean upwards![1]

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[1] For the nation as a whole, including tenured landholdings and urban/peri-urban areas, the 1976 census found the mean "homestead" size to be 5.7 people. A rural homestead survey carried out by deVletter found the mean homestead size in their sample to be 10.4, including physically absent family members that "retain strong traditional ties, obligations and responsibilities with (their) homestead." cf. Fion deVletter, "Subsistence Farmer, Cash Cropper or Consumer?: A Socio-economic Profile of a Sample of Swazi Rural Homesteads," Mbabane: Programmes for Better Family Living, Ministry of Agriculture, August 1979, p. 26.

In our survey, absent family members were counted as residents if they visited or stayed at the homestead at least once a month. However, it is possible that respondents included as residents kinsmen who are absent for longer periods.

TABLE 1

SIZE OF SAMPLED HOMESTEADS

Number of Residents	Number of Respondents	Frequency (Percent)
1 - 3	23	5.1
4 - 6	72	16.0
7 - 9	125	27.8
10 - 12	103	22.9
13 - 15	60	13.3
16 - 18	24	5.3
19 - 21	12	2.7
22 - 24	12	2.7
25 - 27	7	1.6
> 27	12	2.7
TOTAL	450	100.0%

30.8% of homesteads surveyed were situated in non-RDA areas, 20.5% were in low intensity (low input) RDA areas, and 48.7% were in high intensity RDA areas. An RDA (Rural Development Area) is an area that benefits from special infrastructural inputs and extension services from the Ministry of Agriculture. The aim of the RDA program is to increase agricultural productivity and improve living conditions in rural areas. RDA's are classified as high or low intensity areas, depending on the amount of inputs they receive. As of 1981, over 50% of Swazi Nation Land, and an even greater percentage of SNL population, was covered by the RDA program.[1]

27.3% of homesteads surveyed were situated in 22 enumeration areas in the Highveld, 34.7% were in 29 EA's in the Middleveld, 29.1% were in 22 EA's in the Lowveld, and 8.9% were in 8 EA's in Lubombo Plateau region. The 1976 rural population by region was as follows: Highveld, 87,647; Middleveld, 141,258; Lowveld, 80,590; Lubombo, 21,531.[2]

[1] Ministry of Agriculture and Co-operatives Rural Development Areas Programme. Annual Report, 1981, p. 1-3.

[2] Central Statistical Office, Report on the 1976 Swaziland Population Census, Vol. 1, p. 38. Mbabane, 1976.

About 40% of respondents had no formal education, as can be seen in the following table:

TABLE 2

RESPONDENT'S LEVEL OF FORMAL EDUCATION

	Number of Respondents	Adjusted Frequency
No Formal Education	180	40.2
Grade 1 - Std. 1	61	13.6
Std. 2 - Std. 6	142	31.7
Form 1 - Form 3	47	10.5
Form 4 - Form 5	15	3.3
College	3	0.7
TOTAL	448[1]	100.0%

Age and education are related, with younger respondents tending to be better educated (see Table 49 below).

When asked what the highest level of education attained by anyone in the homestead was, the percentage of responses indicating no formal education fell to 7.6% and the response frequencies were quite different overall. These differences reflect the expanded opportunities for schooling in recent years. The latter question was asked because the presence of a literate, relatively educated person in the homestead has implications for health education.

TABLE 3

HIGHEST LEVEL OF EDUCATION OF ANYONE IN HOMESTEAD

	Number of Respondents	Adjusted Frequency
No Formal Education	34	7.6
Grade 1- Std. 1	19	4.2
Std. 2 - Std. 6	117	26.2
Form 1 - Form 3	144	32.2
Form 4 - Form 5	118	26.4
College	15	3.4
TOTAL	447	100.0%

[1] Often the totals are less than 450 due to non-responses to particular questions. A large number of non-responses (more than 5) is indicated in the table itself, but these are not counted in the frequency distribution columns, as indicated by the heading "Adjusted Frequency."

34.9% of respondents reported that they had been visited by an RHM in recent years. 57.6% said they had never been visited, 1.8% said they had been visited irregularly, and 5.8% said they did not know. These findings must be regarded as only approximate since it was found in the pre-test that many rural Swazis did not or could not distinguish between various cadres of extension workers from different ministries, such as rural health visitors (later changed to rural health motivators), domestic science demonstrators, health assistants, community development officers, etc. For this reason several questions about contact with extension workers and sources of information in rural areas were omitted.

Finally, 82.6% had a working radio in their homestead.

Most of the above characteristics were regarded as potentially predictive of the kinds of health knowledge, attitudes, and practices that we sought to measure. Analysis of these variables is reported in Section 7.

SECTION 3: WATER

Water Access

Most respondents lacked access to safe drinking water, as shown in the following table:

TABLE 4

PLACE OF COLLECTING DRINKING WATER

	Number of Respondents	Adjusted Frequency
River or Stream	161	35.9
Unprotected Spring	128	28.6
Standpipe or Tap	77	17.2
Spring, Protected from Animals	32	7.1
Borehole or Well	19	4.2
Enclosed, Protected Spring	12	2.7
Stagnant Pool or Dam	11	2.5
Collected Rainwater	8	1.8
TOTAL	448	100.0%

We see that nearly one-third of homesteads on Swazi Nation Land have access to drinking water that is protected in some way. However, it cannot be assumed that a protected source yields safe drinking water. Protected springs and even boreholes may become fecally contaminated, as an unpublished study by the Rural Water Supply Board in 1981 showed.

Since rural Swazis have limited access to water, answers were not very different from Table 4 when respondents were asked, "Where do you collect other household water?" 47.6% said river or stream, 18.8% said unprotected spring, 11.2% said standpipe or tap, 6.2% said borehole or well, 5.7% said spring protected from animals, 1.1% said rainwater, and 1.4% provided no answer. The surprising finding that a higher number of homesteads use borehole/well water for other household uses than for drinking water provides a behavioral measure for attitudes with regard to borehole water (see below).

Attitudes About Water

Respondents were next asked which kind of water tastes the best, and the worst. As can be seen in Table 5, of the "safe" types of water (standpipe, borehole, enclosed spring, and rainwater) all are regarded as tasting good except for borehole water. Data from the RHM survey corroborate this: borehole water is often regarded as too salty for drinking, at least in the Lowveld. It is probable that an even higher percentage would have named borehole water as the worst tasting, but for the fact that boreholes are found primarily in the Lowveld and a number of Swazis have never tasted water from this source.

TABLE 5

BEST AND WORST TASTING TYPE OF WATER

	BEST TASTING		WORST TASTING	
	Number of Respondents	Adjusted requency	Number of Respondents	Adjusted Frequeny
River or Stream	90	20.3	166	39.0
Unprotected Spring	92	20.7	52	12.2
Standpipe or Tap	129	29.1	13	3.1
Spring, Protected from Animals	50	11.3	11	2.6
Borehole or Well	5	1.1	88	20.7
Enclosed, Protected Spring	44	9.9	10	2.3
Stagnant Pool or Dam	5	1.1	53	12.4
Collected Rainwater	25	5.6	18	4.2
Other	4	0.9	15	3.5
No Answer	6		24	
TOTAL	450	100.0%	450	100.0%

Respondents were then asked to name what they thought were the healthiest and unhealthiest types of water. Only 55.1% named "safe" sources of water as the healthiest kinds; this was caused in part by the low esteem in which borehole water is held. Clearly, there is need for health education in this area.

TABLE 6

TYPE OF WATER THOUGHT TO BE HEALTHIEST AND UNHEALTHIEST

	HEALTHIEST		UNHEALTHIEST	
	Number of Respondents	Adjusted Frequency	Number of Respondents	Adjusted Frequency
River or Stream	71	16.2	181	42.0
Unprotected Spring	72	16.4	53	12.3
Standpipe or Tap	184	41.9	7	1.6
Spring, Protected from Animals	41	9.3	11	2.6
Borehole or Well	7	1.6	74	17.2
Enclosed, Protected Spring	33	7.5	8	1.9
Stagnant Pool or Dam	1	0.2	70	16.2
Collected Rainwater	18	4.1	11	2.6
Other	12	2.7	16	3.7
No Answer	11		19	
TOTAL	450	100.0%	450	100.0%

When RHM's were asked what kind of water people in their areas would like if they had the choice, most said tap or piped water, for the convenience. The health benefits of piped water were less appreciated, or even understood, although RHM's were teaching about such benefits and accelerated learning seems to have taken place recently in areas threatened by cholera and in schools throughout Swaziland.[1] In one area, the RHM reported that people prefer river to borehole water because of the salty taste of the latter.

When RHM's were asked which kind of water people least preferred for drinking, most said river water, a few in the Lowveld areas said borehole water, and about 20% said spring or river water contaminated with cattle feces. It seems that rural Swazis recognize fecal contamination by animals far more readily than that caused by humans. As partial evidence of this, about

[1] In several cholera areas, people were found to prefer tanked-in water to traditional surface water, even if they had to walk further to obtain it. See E. Green, "A Survey of Emergency Water Tank Usage in the Swaziland Lowveld" (1982), and "An Assessment of Cholera Knowledge in Swaziland Primary Schools" (1982). Ministry of Health.

10% of respondents in the sample of homesteads thought that a spring protected only from animals (but not fully enclosed) was the tastiest and healthiest type of water.

Respondents were asked how they usually first judge the quality of drinking water. About two-thirds referred to visual criteria.

TABLE 7

HOW DO YOU JUDGE DRINKING WATER?

	Number of Respondents	Adjusted Frequency
By Color	113	26.9
By Knowing Source	76	18.1
By Degree of Mudiness	66	15.7
By How it Looks	59	14.0
By Taste	47	11.2
By Whether or Not Water is Flowing	43	10.2
By Smell	15	3.6
Other	1	0.2
No Answer	30	
TOTAL	450	100.0%

RHM's were asked the same question about people in their areas. Results were similar to the survey results except that taste was given more importance: about 29% of RHM's mentioned taste first.

Boiling of Water

Respondents were asked if they boil their drinking water. This is the kind of question to which one would expect at least some people would give the "right" answer to please a health department representative. Nevertheless, 83.7% answered no, never.

TABLE 8

DO YOU BOIL DRINKING WATER?

	Number of Respondents	Adjusted Frequency
No, never	375	83.7
Yes, only recently because of cholera threat	52	11.6
Sometimes, depending on convenience	7	1.6
Yes, only if babies are threatened by cholera	4	0.9
Sometimes, when water looks dirty or tastes bad	4	0.9
Yes, always	3	0.7
Usually, except when inconvenient	3	0.7
TOTAL	448	100.0%

Note that fear of cholera seems to be the strongest impetus to boiling drinking water. Subtracting the 11.6% who recently began to boil water out of concern for cholera, only 4.8% remain who even sometimes boil their water. This may be closer to the pre-1981 prevalence figure for boiling.

Information from the RHM survey corroborates the extent of boiling water and adds to our understanding. The main reason cited that prevents people from boiling water was the flat taste (or "tastelessness") of the resulting water. A number of RHM's stressed this. A few mentioned that boiling water is time consuming and people in their area are not willing to invest the time. In the words of one RHM, "If the water appears clean, people see no reason to boil it." Five others made comments of this sort, indicating that many people are unaware or unconvinced of the health benefits of boiled water.

On the other hand, 9 of the 42 RHM's reported that cholera education during 1981, and the cholera scare in general during its first "season," have led a number of people to start boiling their water. This was reported mostly in Lowveld areas, but also in areas near Ntonjeni and Mankayane. In one area near Ntonjeni, people boiled

their water briefly during the early 1981 cholera scare but then stopped the practice after they felt the threat had passed.

Water Transport and Storage

Water is fetched by women and children, especially girls. The number of trips required per day depends on the distance between a homestead and the source of water. 87.1% took between 1-3 trips a day; within that group 45.1% of the total took 2 trips a day.

Most respondents (86.9%) said that between 1-4 people fetched the daily supply of water. 58% of the total specified that between 2-3 people fetched.

Water is usually fetched in the morning and afternoon, or if 3 trips are required, in the morning, noon, and afternoon.

TABLE 9

TIME OF DAY WATER IS USUALLY FETCHED

	Number of Respondents	Adjusted Frequency
Morning and Afternoon	225	51.0
Morning, Noon, Afternoon	96	21.8
Morning	68	15.4
Afternoon	31	7.0
Morning and Evening	11	2.5
Morning and Noon	5	1.1
Noon	3	0.7
Other	2	0.5
Not Applicable, No Answer	9	
TOTAL	450	100.0%

It was discovered during the pre-test that rural Swazis have more difficulty estimating distance than time. For this reason, respondents were asked, "How long does a trip take to reach the place where water is usually fetched?" Most one-way trips took less than 1/2 hour. These findings are supported by the RHM survey.

TABLE 10

TIME REQUIRED TO FETCH WATER

	Number of Respondents	Adjusted Frequency
≤15 Minutes	191	42.6
16-30 Minutes	124	27.7
31-60 Minutes	86	19.2
61-90 Minutes	23	5.1
>90 Minutes	20	4.5
Cannot Estimate	4	0.9
TOTAL	448	100.0%

Water is carried in various types of buckets, tins, or drums. RHM's reported that closed, 20-litre plastic drums have become popular in recent years. In any case, traditional clay jugs and pots have been largely replaced by manufactured containers that have the virtue of being unbreakable. 45.8% of homesteads used a plastic container of this sort; 35.6% used an uncovered bucket; 12.9% used a covered bucket, 2.2% used another type of closed container; only 2 respondents (.4%) used the traditional clay pot; and 3.1% gave miscellaneous answers such as jugs and metal drums.

RHM's estimated that average-sized homesteads use about 50-60 litres of water per day for drinking and all other uses. Using the average homestead size of 10.3 people in the survey sample (admittedly a different sample), and assuming that about 2 members are absent on any given day, we arrive at a daily per capita water consumption of about 6.6 litres.[1] However, there seem to be periods when rates of water consumption are substantially higher, such as when people are plastering walls, brewing beer, or watering their gardens.

Virtually all respondents claimed that their water container was cleaned from time to time. 37.3% said

[1] A survey in rural Lesotho reported a daily per capita water use of 6.5 litres. cf. Feachem et al, Water, Health and Development. London, Tri-med Books, 1978, p. 101.

they used soap or detergent ("Vim"); 34.4% rinsed with water only; 17.4% used water and steel wool; 8.6% used sand or gravel with water; and 2.3% did not clean their container at all. RHM's pointed out that it is the women and girls who clean the containers, and this is usually done in the river or spring and just before filling containers to carry home. However, this may not be done every time, unless it be a simple rinsing-out.

Water may or may not be stored at home in the same container in which it is fetched. RHM's reported that the traditional large clay pot (imbita) was giving way to plastic containers, although not quite to the extent reported by respondents in the homestead survey.

TABLE 11

TYPE OF CONTAINER USED TO STORE WATER AT HOME

	Number of Respondents	Adjusted Frequency
Closed Plastic Container	199	44.4
Uncovered Bucket	112	25.0
Covered Bucket	72	16.1
Other Containers	20	4.5
Covered Clay Pot	17	3.8
Uncovered Clay Pot	16	3.6
Other	12	2.7
TOTAL	448	100.0%

Most homesteads traditionally covered their clay pot or other water container with cloth or dishes to keep soot, dust, cockroaches, children's fingers, etc. out of the water. Buckets were covered in the same way. Some RHM's reported that they had to teach people to cover their water, and that some did not comply.

Water is scooped from most of the unclosed storage containers with mugs or tin cups (96%), or with a calabash, dish, or some other means (4%). Some sharing of the same cup of drinking water may occur, and unused water from the cup may be returned to the storage container, but these practices were not measured accurately. In general, wastewater is thrown in the yard or used to water gardens.

Swimming and Bathing

Since bilharzia transmission in Swaziland is closely related to the swimming behavior of children and adolescents, information on such behavior was sought. First, respondents (all but 6 of whom were over the age of 18) were asked if they swam or bathed in natural bodies of water. About half replied yes or occasionally.

TABLE 12

DO YOU (ADULT) SWIM/BATHE IN RIVERS, PONDS, ETC.?

	Number of Respondents	Adjusted Frequency
Yes	193	43.3
No	145	32.5
Bathe at Home	77	17.3
Sometimes	19	4.3
Warm Weather Only	8	1.8
Rarely	4	0.9
TOTAL	446	100.0%

A somewhat higher prevalence of swimming was reported among children, as shown in the following table.

TABLE 13

DO YOUR CHILDREN SWIM/BATHE IN RIVERS, PONDS, ETC.?

	Number of Respondents	Adjusted Frequency
Yes	263	63.8
No	112	27.2
In Warm Weather	15	3.6
Sometimes	19	4.6
Rarely	3	0.7
Not Applicable, No Children	37	
TOTAL	450	100.0%

Most children and adults have contact with water during the period of major bilharzia transmission, as seen in the following table.

TABLE 14

TIMES OF DAY WHEN ADULTS AND CHILDREN SWIM/BATHE IN RIVERS, PONDS, ETC.

	ADULTS		CHILDREN	
	Number of Respondents	Adjusted Frequency	Number of Respondents	Adjusted Frequency
Early A.M.	8	2.7	3	1.0
Late A.M.	14	4.8	18	5.7
Noon	58	19.9	78	24.8
Early Afternoon	72	24.7	100	31.7
Late Afternoon	80	27.4	33	10.5
Evening	17	5.8	13	4.1
When it's Hot	26	8.9	56	17.8
Combination of Above	17	5.8	14	4.4
Not Applicable, Other, No Answer	158		135	
TOTAL	450	100.0%	450	100.0%

According to RHM's interviewed, the middle of the day is the favorite time for children to swim, although school children also frequently swim after school. In some areas, where bilharzia is recognized as a problem, parents and health promoters have tried to discourage or forbid children from swimming, but with little success.

SECTION 4: SANITATION AND HYGIENE

Latrine Coverage and Characteristics

About 21.1% (95 respondents) of the sample had a finished latrine, including one respondent who had more than one latrine. 70.4% (317 respondents) had no latrine.

TABLE 15

DO YOU HAVE A LATRINE?

	Number of Respondents	Adjusted Frequency
No	317	73.9
Yes	94	21.9
Latrine Unfinished	17	3.9
Have 2 or More	1	0.2
No Answer	21	
TOTAL	450	100.0%

By comparison, the 1976 census reported that 18.4% of homesteads throughout Swaziland had a pit latrine.[1] However, the concentrations of latrines were greatest in the peri-urban areas of Mbabane and Manzini. If we exclude these areas we arrive at a latrine coverage of between 14-15% (depending on weighting). This includes the town areas of Piggs Peak, Nhlangano, Hlatikulu, etc., but the population base is more comparable to that of the present study than the countrywide figure of 18.4%. In an case, it is clear that there has been a great deal of latrine construction in the 5 years since the 1976 census, especially when population increase is taken into account.

Homesteads were likeliest to have latrines in the Highveld, followed by the Middleveld, Lowveld, and Lumbombo Plateau.

[1] Central Statistical Office, Report on the 1976 Swaziland Population Census, Vol. 1, p. 77. Mbabane, 1976.

TABLE 16

PRESENCE OF LATRINES, BY REGION

	Highveld	Middleveld	Lowveld	Lubombo Plateau
Have Toilet or Building one	39.2% (47)	31.1% (47)	12.3% (15)	10.8% (4)
Lack Toilet	60.8% (73)	68.9 % (104)	87.7% (107)	89.2 % (33)

Chi-square = 29.0 (3 degrees of freedom)
Significance = .001

Respondents with higher levels of education were likelier to have a latrine, as can be seen in Table 17. Latrine ownership is further associated with the highest level of education attained by anyone in the homestead, as seen in Table 18. The latter variable may relate to income, which in turn ought to be related to latrine ownership. However, no data on income were collected in the present survey.

TABLE 17

OWNING A LATRINE, BY RESPONDENT'S LEVEL OF EDUCATION

	None	Grade 1- Standard 1	Standard 2- Standard 6	Form 1 and Above
Have no Latrine	86.2% (150)	74.1% (43)	67.9% (91)	52.5% (32)
Have Latrine, or in Progress	13.8 % (24)	25.9 % (15)	32.1% (43)	47.5% (29)

Chi-square = 30.77 (3 degrees of freedom)
Significance = <.001

TABLE 18

OWNING A LATRINE, BY HIGHEST LEVEL OF EDUCATION IN THE HOMESTEAD

	None	Grade 1-Standard 1	Standard 2-Standard 6	Form 1-Form 3	Form 4 and Above
Have no Latrine	93.9% (31)	94.4% (17)	85.0% (96)	69.9% (95)	59.5% (75)
Have Latrine, or Latrine Being Built	6.1% (2)	5.6% (1)	15.0% (17)	30.1% (41)	40.5% (51)

Chi-square = 32.465 (4 degrees of freedom)
Significance = $<.001$

Latrine ownership was less strongly associated with size of homestead and having contact with a RHM.

TABLE 19

OWNING A LATRINE, BY WHETHER OR NOT RHM VISITS HOMESTEAD [1]

	RHM Does Not Visit	RHM Does Visit
Have no Latrine	78.2% (190)	66.2% (102)
Have Latrine or Latrine Being Built	21.8% (53)	33.8% (52)

Chi-square = 6.32 (1 degree of freedom)
Significance = .012

[1] Note that latrines in some stage of construction are counted in this tabulation, so that the total number of latrines here exceeds the number of finished latrines (95) for our sample.

TABLE 20

OWNING A LATRINE, BY HOMESTEAD SIZE

	1-3	4-6	7-9	10-12	13-15	16 or more
Have no Latrine	84.2% (16)	85.5% (59)	74.0% (90)	64.6% (64)	75.4% (43)	71.4% (45)
Have Latrine, or Latrine Being Built	15.8% (3)	14.5% (10)	26.2% (32)	35.4% (35)	24.6% (14)	28.6% (18)

Chi-square = 10.53 (5 degrees of freedom)
Significance = .06

Of those homesteads which had latrines, 78% had a single-hole pit latrine; an additional 5% had a vented latrine of this type. 9% had a double-hole pit latrine, with an additional 2% having a vented latrine of this type. 6% had other types of latrines.

Regarding the type of latrine slab in use, 31% used concrete slabs and 69% used non-concrete (or non-exclusively concrete) slabs or floors. Concrete slabs, which are reinforced with iron rods and follow a standard design were, at the time of the survey, provided by the Health Inspectorate section of the MOH at a cost of E5 to a homestead.[1] Typically, a Health Assistant visits homesteads that use these slabs at least once or twice to advise about the dimensions of the pit, the placement of the slab, and the use of the vent pipe which has now become a required component of government-approved latrines. The slab may be made at a central location and then delivered to, or near, a homestead, or the slab may be made on location under the supervision of the Health Assistant.

Other types of slabs or floors usually require no outside assistance or materials.

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[1] The actual cost was E10 because a slab was not sold without a vent pipe, which costs an additional E5. At the time of the survey, the Lilangeni (E1) was almost exactly equivalent to the U.S. dollar.

TABLE 21

TYPE OF SLAB OR FLOOR USED IN LATRINE

	Number of Respondents	Adjusted Frequency
Wooden Planks	48	45.7
Concrete	33	31.4
Wood, Concrete, Mud	9	8.6
Wood, Mud or Soil	9	8.6
Other	6	5.7
Not Applicable	345	
TOTAL	450	100.0%

Information from the RHM survey suggests more of a 50-50 balance between government-assisted or concrete slab latrines and what we might call home-made latrines. However, RHM's sometimes seemed embarrassed to admit that people made latrines out of poles and packed dirt, so it is possible that this latrine type is under-reported.

RHM's were usually certain and explicit about the number of latrines in their areas; a total of 321 were reported for 42 areas representing 1,680 homesteads. Thus in RHM areas, which constitute a non-random sample of rural Swaziland, 19.1% of homesteads had finished latrines. This is within two percentage points of the proportion found to have latrines in our random sample of homesteads.

Of further interest is the RHM survey finding that an additional 142 latrines, or 11.8% of the homesteads in the RHM areas, were found to be under construction in some manner, e.g. a pit had been dug or a slab or floor had been bought or built. Only 4% of homesteads in the homestead survey (about 65% of whom were not visited by RHM's) had latrines under construction. Even if we allow for some exaggeration on the part of RHM's concerning what constitutes a latrine under construction, it appears that considerably more latrine construction

is occurring in RHM-visited areas than in other areas.[1]

The homestead survey found that most (71%) of those who relied on outside sources claimed they had no problem in obtaining their slab, while a corresponding 29% reported problems.

12% (58) of those who used concrete slabs, whether completely concrete or concrete veneer over wood or packed dirt, made their own on location.

A rather different picture emerges from RHM's. Most (24) claimed there were problems and delays in obtaining concrete slabs in their areas; 10 reported no problems currently, although there had been some in the recent past; and the remaining 8 had no answer, usually because there were no latrines in their areas. Those who cited problems made such comments as: "The roads are impassable in my area;" "we have had to hire a vehicle to deliver slabs in this area;" "we're still waiting for deliveries;" "cows and children have fallen into some of the open pits and now those people are angry with me for advising that people dig pits."

In the homestead survey, 66% of respondents had had their latrine for less than 7 years. The mean number of years is 5.8 years, if we assign a value of 23 years to the 7 homesteads which have had a latrine for "more than 21 years." However, this figure should not be taken as the average life of a pit latrine; it is only an indication of trends in the building of latrines.

Interestingly, those having latrines that do not use a concrete slab reported having had their latrine for an average of 9.4 years. It is possible that some respondents interpreted the question as asking how long they had owned any latraine, rather than the latrine then in use, which would skew the

[1] In an earlier evaluation of the effects of Rural Health Visitors (the former name for RHM's), Prinz and Mndzebele found slightly less latrine construction in RHV-visted areas, compared with other areas. Report of an Evaluation of the Rural Health Visitors Programme. Mbabane: UNICEF and Ministry of Health, 1980.

data upward. On the other hand, Health Assistants have reported wooden latrines lasting well over 10 years.

TABLE 22
HOW LONG HAVE YOU HAD YOUR LATRINE?

Number of Years	Number of Respondents	Adjusted Frequency
Cannot say	9	9.0
1-3	59	59.0
4-6	7	7.0
7-9	6	6.0
10-12	5	5.0
13-15	4	4.0
16-18	2	2.0
19-21	1	1.0
> 21	7	7.0
Not Applicable, Have no Latrine	350	
TOTAL	450	100.0%

Mean = 5.8 (SD = 6.5)

Most respondents (56.9%) reported that they were satisfied with their latrines, but a significant minority (43.1%) claimed dissatisfaction. To summarize reasons for dissatisfaction: 51.2% mentioned a superstructure problem such as leaking roof or crumbling walls; 14.6% said problems with seat or covering; 9.8% said problems with smell; 7.3% said pit is full or nearly full; 4.9% need more than one latrine; 4.9% said they prefer a better type of latrine; 2.6% said pit is caving in or filling up with water; 2.4% said latrine is hard to clean; and 2.4% said a combination of smell and the pit filling up. It should be noted that only 41 respondents provided this information so we should be cautious about drawing conclusions.

RHM's generally reported that people in their areas had no problems in keeping their latrines clean, including latrines lacking concrete slabs. Many people threw ashes in the pit to combat smell; a few used disinfectant. Women, or sometimes, children, cleaned the floor and seat area with soap or disinfectant and water, and a brush. Some women used water only to rinse, then later swept the area. A few women were described by RHM's as lazy and were said to seldom clean their latrines at all.

Labor and Motivation in Latrine Construction

Respondents were then asked who dug the pit for their latrines. Perhaps the striking finding was that about 36% relied on hired labor and 28% relied on children. These figures are confirmed by the RHM survey.

TABLE 23

WHO DUG THE PIT FOR YOUR LATRINE?

	Number of Respondents	Adjusted Frequency
Homestead Head	32	30.5
Other Male Member	4	3.8
Hired Labor	38	36.2
Children	29	27.6
Combination of Above	2	1.9
TOTAL	105	100.0%

39 respondents paid money to have their pit dug, although only 25 could estimate the amount. 11 replied between E5-8,[1] 7 replied between E9-12, 3 replied between E1-4, another 3 replied between E17-20, and 1 replied between E21-24. The average (i.e. weighted mean) amount was E9.22.

Homestead heads were slightly more active in building their superstructures, but the pattern was not very different from that of digging pits. Most superstructures are made of mud and sticks or poles, according to RHM's, while others are made of cinderblocks, bricks, stone and mud, or wooden offcuts.

TABLE 24

WHO BUILT THE LATRINE SUPERSTRUCTURE?

	Number of Respondents	Adjusted Frequency
Homestead Head	38	37.6
Other Male Member	8	7.9
Hired Labor	25	24.7
Homestead Women	5	5.0
Children	21	20.8
Friends, no Payment	2	2.0
Combination of Above	2	2.0
TOTAL	101	100.0%

Only 11 respondents were able to estimate amounts spent for labor involved in building their superstructures. The average (mean) amount was E12.68. A larger number (80) remembered paying for superstructure materials, although only 42 offered an estimate. The average amount was E16.41, although this may be a slight underestimate since 7 respondents replied "more than E28" and there is no way of knowing how much more.

The important observation is that, adding up the average costs of labor and superstructure materials, as well as the E10 for a concrete slab and vent pipe for those opting for the government promoted type of latrine, a number of rural Swazis had to pay approximately E48 before they had a completed latrine. In this category would be homesteads in which all or most able-bodied adult males were absent much of the time, so that hired labor was required.

When asked who motivated people in a homestead to build a latrine, 45% of respondents replied no one, followed by 23% who said a Rural Health Motivator. Those who replied no one presumably preferred to credit themselves, rather than anyone else in particular, with the decision to build a latrine.

TABLE 25

WHO MOTIVATED YOU TO BUILD A LATRINE?

	Number of Respondents	Adjusted Frequency
No One	45	44.1
Rural Health Motivator	23	22.5
Family Member	15	14.7
Health Assistant	7	6.9
Chief or Sub-Chief	7	6.9
Nurse	3	2.9
Friend	1	1.0
Teacher	1	1.0
TOTAL	102	100.0%

Patterns of Latrine Usage

A certain amount of empirical and anecdotal evidence suggested that some men would be unwilling to share a latrine with their daughter-in-law or with any woman at all. However, when asked if all family members share the same latrine(s), 84.8% said yes, 9.5% said no, and 5.7% specified that children did not use the latrine. When asked if visitors may use their latrines, 97% said yes.

Information from the RHM study corroborates the findings on latrine access on the part of family members and visitors. It would appear that even if people prefer having two latrines, or a double-pit latrine with a partition separating male and female sides, they are usually not willing to spend the extra effort and money.

Most children seemed to be over 5 years of age before they began to use a latrine. RHM estimates and pre-test results indicated a slightly earlier age, which accounts for the age scale going only to 7 in the following table.

TABLE 26

AGE OF CHILDREN WHEN THEY BEGIN USING LATRINE

	Number of Respondents	Adjusted Frequency
About 1	2	1.9
About 2	7	6.7
About 3	7	6.7
About 4	23	21.9
About 5	16	15.2
About 6	23	21.9
>7	26	24.7
Children Don't Use	1	1.0
TOTAL	105	100.0%

When asked where children generally urinate, 81.9% of respondents with latrines admitted that children go in the open, 12.4% said in the latrine, and 5.7% said it depends. To the more general question, "Is your latrine used for passing water?", 48.5% said yes, 47.4% said no, 2.1% said sometimes, 1% said mostly by women, and 1% said mostly by men.

Hereafter, questions were asked of all respondents, regardless of whether or not they had a latrine.

The question was asked, "If children do not use a latrine, are any stools left in the yard?"

TABLE 27

METHOD OF DISPOSING OF CHILDREN'S STOOLS

	Number of Respondents	Adjusted Frequency
Thrown in Bush	240	58.7
Thrown in Latrine	66	16.1
Thrown in Hole	50	12.2
Thrown in Hole, Covered	34	8.3
Left Alone	3	0.7
Other	16	3.9
No Answer, No Children	41	
TOTAL	450	100.0%

Miscellaneous answers included, "throw at end of yard," "throw in running water" and "throw it away."

It was found during the pre-test that it was not feasible for interviewers to ask people who lack a latrine where they defecate, even though several phrasings of the question were tried. Likewise, a question was dropped on whether or not those with access to a latrine return to use it when out in the fields. However, the RHM survey provided some information on the latter, which may additionally shed light on the first and more general question. Of the 39 RHM's who were able or inclined to answer the question about returning from the fields, 16 said that in their area, those with latrine access simply go in the bush and don't bury or cover their feces; 15 said people go in the bush and some of these bury and cover their feces; 6 said some people return to their latrines and some go in the bush; and 2 said people return to their latrines.

Related to the above, it was discovered that chamber pots (shemba, sikigi) could be found in most homesteads

(59.8% in the homestead survey).[1] This was corroborated by RHM's. They pointed out that plastic and other types of dishes are often used to pass urine and stools in at night, not only because of convenience, but because people are afraid to go out at night (witches and robbers were frequently mentioned in this connection). If people have a latrine, they empty bed pans there in the morning. Otherwise, they throw the contents "in the bush," i.e., out of the yard, or in a hole which is sometimes covered.

Personal Hygiene

Respondents were asked if they washed their hands after defecation. 89.5% gave an unqualified yes, 7.3% said no, 2.9% said sometimes, .2% said only if water is available, and .2% did not answer. Similar responses were given to a question about washing hands before eating: 91.8% said yes, always; 4.9% said sometimes, when hands are dirty; 2.2% said sometimes, when eating with hands; and only 1.1% said no. A question on washing hands before preparing food provoked an almost identical response: 92.4% said yes.

It is noteworthy that about two-thirds of those surveyed said they eat with their hands. Men are likelier than women to use eating utensils.

TABLE 28

DO YOU EAT WITH YOUR HANDS?

	Number of Respondents	Adjusted Frequency
Yes	300	66.7
No	101	22.4
Sometimes	48	10.7
No Answer	1	0.2
TOTAL	450	100.0%

[1] Feachem et al (op cit, p. 129) found a very similar prevalence of chamber pots in rural Lesotho.

Respondents were also asked how they wash their hands.

TABLE 29

WITH WHAT DO YOU WASH YOUR HANDS?

	Number of Respondents	Adjusted Frequency
Fresh water	257	60.6
Soap and Water	155	36.6
Re-used Water	10	2.4
Cloth or Paper, No Water	2	0.5
Other, No Answer	26	
TOTAL	450	100.0%

Common sense suggests that the reported frequency of hand-washing is exaggerated. When RHM's were asked if people in the homesteads they visit wash hands before eating, they felt that only some--perhaps more like 50%--actually do. Many further commented that handwashing is a new practice in their areas that is developing because of health education and the cholera scare. However, in a few areas the practice seems to be traditional.

The practice of washing hands before preparing food seems to be more widespread (as well as traditional), according to RHM's.

RHM's also reported that people usually wash their bodies completely about two or three times a week, depending on the air temperature. In cold weather, or in areas far from suitable surface water, complete washing may only occur once a week or less. In cold weather, some people heat water in their homesteads and wash there, but if water has to be carried from much of a distance this practice becomes less common.

Respondents were asked if they kept their dishes or pots of food covered before use. Most reported they follow this practice.

TABLE 30

DO YOU COVER FOOD DISHES BEFORE USE?

	Number of Respondents	Adjusted Frequency
Yes	375	83.3
No	46	10.2
Sometimes	19	4.2
For Adult Men Only	4	0.9
For Homestead Head Only	3	0.7
No Answer	3	
TOTAL	450	100.0%

These findings are corroborated by the RHM study, although there seem to be some regional variations. In some areas it is traditional to protect food from flies and dirt--especially food for the husband--and in other areas RHM's have to actively promote the protection of food.

Sanitation Constraints

The 334 respondents who had no latrine, or whose latrine was unfinished, were asked why they lacked a latrine. Of these, 317 provided answers.

TABLE 31

IF YOU HAVE NO LATRINE, WHAT IS THE REASON?

	Number of Respondents	Adjusted Frequency
Don't Have the Material or Money	90	28.4
Never Thought About it	84	26.5
Don't Know how to Build One	32	10.1
Want to Have One	31	9.8
Don't Have the Transport	25	7.9
Have no one to Dig Pit	25	7.9
Plan to Move or be Relocated	17	5.3
Don't Want One	13	4.1
Not Applicable/No Answer	133	
TOTAL	450	100.0%

The 17 respondents who claimed previously to have an unfinished latrine were asked why their latrine was not

yet completed. Of the 13 who replied, 4 said they were awaiting a slab, 3 said their pit was caving in, 2 said they expected to move, 1 said he was still making his own slab, 1 said his pit was full of water, 1 said his latrine was recently destroyed, and 1 simply said his latrine was not finished.

The question of why more people do not have latrines was posed to RHM's. This was also discussed with traditional healers in a separate study, and with various extension workers in the Ministries of Health and Agriculture. The constraints identified by these various informants can be summarized as follows:

1) delays in delivery of concrete slabs and the danger of a deep, exposed pit for animals or children to fall into.

2) the inertia of tradition. People see no need--or even find it distasteful--to defecate "in a house," especially since their ancestors did not follow this practice.

3) labor and costs involved in digging a deep pit and building a superstructure.

4) costs involved in purchasing a concrete slab and a vent pipe.

5) fear of sorcery. People may believe that they can be victimized by spells involving their feces or urine, or by "poisons" placed by enemies or sorcerers on toilet seats or entrances to latrines.

6) the expectation of moving, or being relocated to an RDA area. Some are therefore postponing any decision to build a latrine.

7) fear of pit caving in--especially in areas with sandy soil--and of slab falling in.

8) lack of technical knowledge of how to build a latrine.

Those without a latrine were asked how much money they thought they would actually pay for necessary labor or material, should they want a latrine: 223 respondents could not or would not estimate and 11 said outright that they did not want a latrine. 88 provided an estimate.

TABLE 32

HOW MUCH WOULD YOU SPEND FOR A LATRINE?

	Number of Respondents	Adjusted Frequency
<E5	13	14.8
E6 - E10	23	26.1
E11 - E15	10	11.4
E16 - E20	12	13.6
E21 - E25	8	9.1
E26 - E30	3	3.4
>E30	19	21.6
TOTAL	88	100.0%

Mean = E16.56 (SD = 10.9)

It would seem from the above that there is a percentage--some 20%--of rural Swazis who would like to have a latrine and who are simply awaiting technical advice, deliveries of materials, or some other form of outside assistance. A larger group has not yet made the decision to have a latrine, but with the right approach and some patience, they could be persuaded to make the necessary investments. The remaining percentage may be unpersuadable, at least for the time being, assuming prevailing strategies and policies.

If the Government encouraged the building of "appropriate technology" latrines, even in conjunction with its current latrine program, several (but not all) of the constraints to latrine construction would be overcome. An appropriate technology latrine would be one which used only locally available materials, required a minimum of technical advice to build and no direct outside assistance, and could be moved oftener and more easily since the "slab" consists of more perishable, lighter, and cheaper materials. Since some two-thirds of the latrines in the sample are already

of this type, having evolved with no official Government encouragement, it would seem that an active policy of encouragement and the provision of technical advice would lead to a significant increase in the rate of latrine construction in the rural areas.

Of course, latrine construction is only the first step; latrine usage is an equally formidable problem. We have already seen that young children and elders tend not to use latrines, and that people will not walk very far to use their latrine if they happen to be away from the immediate homestead area. This suggests that even those who own latrines remain unaware or unconvinced of the health related reasons for using a latrine. There is a clear need for intensified health education in this area.

SECTION 5: INFANT FEEDING PRACTICES

Since incorrect infant feeding practices often lead to water related and other diarrheal diseases, the survey sought information on such practices.

Breast Feeding

Approximately 64% of the 402 homesteads with babies present reported that they breast feed their babies.

TABLE 33

IS THE BABY/BABIES IN YOUR HOMESTEAD BREAST FED?

	Number of Respondents	Adjusted Frequency
Yes	259	64.4
No	131	32.7
Not all Babies	11	2.7
Sometimes	1	0.2
Not Applicable	48	
TOTAL	450	100.0%

The extent of breast feeding may be exaggerated in Table 33 because when asked, "On what do you feed the baby or babies?", only 43% (of a smaller number of respondents) specified the breast, either alone or combined with bottle feeding. Respondents may have told the interviewer what they thought was the right, or expected, answer to a general question on breast feeding. On the other hand, the question in Table 33 may have been interpreted as asking if the baby was ever breast fed, rather than is the baby breast fed (i.e. now).

Table 34 summarizes the answers to the second question. The 64 respondents who specified another method of feeding usually mentioned plates or dishes, which may indicate that they had children and not babies in mind (the siSwati word umntfwana, which can mean either baby or child, was used in interviewing). For this reason, these 64

respondents were discounted in the frequency tabulations, along with the 33 who said they had no babies.

TABLE 34

ON WHAT DO YOU FEED BABY OR BABIES?

	Number of Respondents	Adjusted Frequency
Bottle	112	32.0
Breast, Bottle	78	22.0
By Breast Only	74	21.0
Cup	50	14.0
Bottle and Cup	39	11.0
Other	64	
Not Applicable	33	
TOTAL	450	100.0%

RHM's reported that health education efforts were leading to an abandonment of bottle feeding in favor of breast feeding and cup feeding. A few RHM's (especially in the area around Zombodze Clinic) claimed that there were no feeding bottles in use at all in their areas. The most frequent comment was that a majority of women breast feed, older babies are fed milk and porridge (indengane, sithubi)[1] by cup, and some women use bottles for milk, or secondarily for watery porridge, baby formula, or fruit juices. This information is a bit at odds with the data presented in Table 34 which indicate that 65% of homesteads make some use of a feeding bottle. However, the declining trend in bottle use may be accurate.

Water and Feeding

Respondents were also asked what kind of water they used to dilute or mix with baby food, and how the feeding bottle or cup was cleaned.

[1] Indengane is a watery porridge of maize mealie with perhaps a bit of salt or milk added. Sithubi is similar, but with milk substituted for water. Babies may be fed these porridges between 3-9 months of age, at which point the thicker porridge (phalishi, sishwala) is introduced.

TABLE 35

WHAT KIND OF WATER IS USED TO DILUTE OR MIX IN WITH BABY FOOD?

	Number of Respondents	Adjusted Frequency
Boiled	297	93.7
Unboiled	15	4.7
Cannot Say	5	1.6
Not Applicable	133	
TOTAL	450	100.0%

TABLE 36

HOW IS THE BABY BOTTLE OR CUP CLEANED?

	Number of Respondents	Adjusted Frequency
Soap, Boiled Water	92	35.8
Boiled Water Only	85	28.5
Soap, Unboiled Water	65	21.7
Brush, Soap, Water	21	7.0
Brush and Water	17	5.7
Rinsed Only	16	5.3
Don't Know	2	1.0
Other, Not Applicable	152	
TOTAL	450	100.0%

The 93.7% figure in Table 35 for the use of boiled water in baby food is so high as to be suspect. One would expect some reflection of this practice in Table 8 (Section 3), on the frequency of boiling drinking water, if it were as widespread as reported. However, there is corroborative evidence that boiling water for babies has become widespread, even if not quite to the degree reported by mothers in a survey context.

RHM's were also asked what kind of water is used to mix with, or dilute, milk or baby food. Of the 34 who were able to answer, 33 claimed that boiled water is generally used; only 1 RHM reported that unboiled river water was commonly used. Of those who reported boiled water, most said they felt that all mothers boil water for this purpose. Several commented that this is a recent

practice resulting from health education. It is striking that this finding tends to corroborate the nearly 94% of the respondents in the homestead survey who self-report the same behavior--yet both surveys indicate that less than 16% of rural Swazis boil their own drinking water, even when we include those living in areas threatened by cholera at the time of interviewing. [1] It would appear that concern for their babies makes women of child-bearing age an especially receptive audience, and maternal/child health an especially fruitful topic, for health education.

For those areas where feeding bottles were in use, 11 RHM's reported that some or most women in their areas used boiled water and soap when cleaning their bottles; 3 others said "hot water." Other women used cloth, brushes, or steel wool and water; gravel or sand and water in the bottle--with or without soap. Some used salt water. Three RHM's reported that little cleaning of bottles was done in their areas.

Weaning Age

Table 37 reflects the reported age at which babies stop being breast fed. Data from an earlier study in Swaziland indicate that reported weaning age has remained fairly stable over the past 12 years. [2]

[1] Feachem et al (op cit, p. 128) reported a tendency in Lesotho--still not widespread at the time of survey--for mothers to boil water for their babies even though the practice was rare for adults.

[2] Viletta Dlamini, "Report on Nutrition in Swaziland" in Proceedings of the Eastern African Conference on Nutrition and Child Feeding, Nairobi, 1969 (Washington, D.C.: U.S. Government Printing Office), p. 103.

TABLE 37

AGE AT WHICH BABIES STOP BEING BREAST FED

	Number of Respondents	Adjusted Frequency
0-3 Months	9	2.4
4-7 Months	15	4.0
8-11 Months	19	5.0
12-15 Months	85	22.6
16-19 Months	92	24.5
20-23 Months	40	10.6
24-27 Months	109	29.0
28 Months or More	7	1.9
Cannot Answer	27	
Not Applicable (No Babies	47	
TOTAL	450	100.0%

Mean Age = 18.3 Mos. (SD = 6.4)

Evidence from a recent university study by Motshabi[1] suggests that weaning is considerably earlier in urban and peri-urban areas. In rural homesteads, the nursing woman's mother-in-law normally decides when weaning should begin, and this may be a factor in maintaining a relatively late weaning age in traditional homesteads. Moreover, there are more employed women in urban areas, and these women, of necessity, wean their babies at an earlier age.

RHM's were asked a question not asked in the homestead survey, namely, how old babies are before they are first fed by cup or bottle--whether or not they are additionally fed by breast for a period. 20% of RHM's said about 3 months or slightly less, 15% said between 4-7 months, 4% said about 12 months, and 3% said 8-11 months.

Some sub-regional differences emerged in weaning ages: they were latest in Highveld III, Lowveld II, and Lubombo I; they were earliest in Middleveld III, Highveld II, and Middleveld IV (see Section 7 for explanation).

[1] Florence Motshabi (personal communication, May 1982) reported an average weaning age of 9.3 months for her sample of 150 mothers in 6 peri-urban areas. 43% of the mothers were employed.

However, there were no regional (referring to the 4 physiographic areas, or velds, of Swaziland) differences in age of weaning, extent of breast feeding, or other infant feeding practices.

There was a significant association between breast feeding and RDA status.

TABLE 38

METHOD OF INFANT FEEDING, BY RDA CATEGORY

Method of Feeding	RDA STATUS OF AREA Non-RDA	Low Intensity RDA	High Intensity RDA
Breast fed Exclusively	45.1% (55)	39.1% (34)	30.4% (63)
Not Breast fed Exclusively	54.9% (67)	60.9% (53)	69.6% (144)

Chi-square = 7.4 (2 degrees of freedom)
Significance = .02

As we see, breast feeding, at least as an exclusive practice, is commoner in non-RDA or low-intensity RDA areas. This would seem to indicate that breast feeding is commoner in more traditional areas, although more detailed studies need to be done before this conclusion can be reached.

There was no significant relationship between infant feeding practices and education.

It was observed that females reported an earlier weaning age than males. It is possible that the males' answers were based on traditional norms and female answers were based more on actual behavior.

TABLE 39

REPORTED AGE OF WEANING, BY SEX OF RESPONDENT

	Male	Female
Over 20 Months	48.8% (60)	34.8% (45)
Under 20 Months	51.2% (63)	65.2% (178)

Chi-square = 6.96 (1 degree of freedom)
Significance = .008

SECTION 6: KNOWLEDGE OF WATER AND SANITATION RELATED DISEASE

Traditional Swazis hold to a theory of social or mystical causation of disease,[1] yet, judging by the results of other surveys in Swaziland, they are reluctant to express these beliefs to interviewers using impersonal data-gathering techniques. Part of the reason for this is that Swazis feel defensive about their traditional health beliefs and practices in the presence of modern health sector representatives.[2] The result is that through survey research at least, we can expect to measure little more than a Swazi's ability to recall and retell "modern" explanations he has learned from a variety of sources. Some respondents to our questions on disease causation even dissociated themselves from their answers by prefacing their remarks with, "According to the radio...," or "I'm told that...," or "I don't know but some say that..."

The value of the responses to survey questions of this type is that they are an indication of a person's awareness, and awareness is often a necessary (but not sufficient) pre-condition for behavior change.

The questions discussed in this section are distinctive in that they were presented as open-ended; respondents could reply in any way they chose and their responses were recorded verbatim. Two researchers subsequently read through and categorized the resulting 1,800 answers independently of one another. A few compromises had

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[1] For a more detailed discussion of this topic, see Edward Green, "Traditional Health Beliefs, Practices, and Practitioners in Swaziland" (in preparation). Swaziland Ministry of Health.

[2] For example, few Swazis admit consulting traditional healers when questioned by enumerators. See Inga-Lill Andre, Dinah Rabemila and Maria Smitt, "The Living Conditions of Women in the Northern Rural Development Area of Swaziland 1977 (Draft Report), United Nations Office of Technical Cooperation.

to be made when there were disagreements over answer categories or the assignment of answers to specific categories.

It is noteworthy that the non-response rate was especially high for questions on disease cusation. This does not necessarily mean the respondent had no ideas on the subject. Non-response could result from impatience or lack of probing on the part of the interviewer. It could also mean the respondent had a traditional interpretation of disease which he felt constrained to reveal.

Bilharzia

It is probable that most rural Swazis share a theory of disease causation with the traditional healers and diviners (tinyanga, tangoma) that they consult. Interviews with traditional healers indicated that urinary bilharzia[1] is referred to as umtfundza-ngati, or "blood-in-the-urine," and is thought to derive from several causes, including: 1) environmental contamination due to a healer's failure to purify an area after the preparation of powerful medicines; 2) umklwebho, that is, deliberate poisoning or harmful spells by an enemy or a sorcerer; 3) intercourse with a person who has certain types of Western drugs in his or her bloodstream; 4) simply taking certain modern medicines; or 5) likhubalo, a spell activated when a man has intercourse with another man's wife or girlfriend. Children in Swaziland have also been warned that jumping over fire results in blood in their urine, but healers did not seem to take this explanation seriously.

At the same time, a majority of traditional healers, 52% of 50 interviewed, gave scientifically acceptable answers to questions on the cause of bilharzia. Some mentioned small creatures (tilwane letincane) or snails in water; most said standing or swimming in stagnant, contaminated water.

[1] Intestinal bilharzia, because of its different symptoms, seems to be regarded by traditional Swazis as a separate disease, one that is related to or classified under diarrhea (umsheko. See below.).

It is difficult to determine the degree to which scientific explanations of bilharzia or other diseases are understood, accepted, or integrated with traditional beliefs. Some healers may regard the two types of explanations as competing and mutually incompatible. Others seem to have integrated the two explanations into one system of understanding, with the traditional explaining the ultimate cause (why one becomes sick) and the scientific explaining the immediate cause (how one becomes sick). Such healers treat bilharzia accordingly, using one type of medicine to remove the spell and another type to treat the physical symptoms.

It is noteworthy that healers disagreed over traditional causes of bilharzia; some admitted that it was a difficult or "stubborn" disease to treat.

When survey respondents were asked about bilharzia (umtfundza-ngati), the 61% who provided answers showed clear evidence of the effects of health education.

TABLE 40

WHAT CAUSES BILHARZIA?

	Number of Respondents	Adjusted Frequency
Contact with dirty or stagnant water through swimming or washing	128	46.6
Water with worms, tadpoles, germs or small animals	54	19.6
Drinking dirty or unboiled water	54	19.6
Flies, insects, or mosquitoes	13	4.7
Snails	6	2.2
Lack of latrine or urinating in water	4	1.5
Witchcraft or wizards	3	1.1
Miscellaneous answers	13	4.7
No answer	175	
TOTAL	450	100.0%

Miscellaneous answers to Table 40 included: untidiness, germs, eating wrong foods, too much heat, and jumping over fire.

Note that three of the answer categories dealt with water. These were differentiated on the basis of whether the answers denoted drinking or simply bodily contact with water, and further, whether answers referred to organisms rather than simply "dirt" in the water, or the water's stagnant condition. While differences between these answers

are important for their health education implications, it is noteworthy that 85.7% of all answers (discounting non-responses) dealt with water. However the piecemeal, incomplete nature of the answers tends to confirm the observation of many local health personnel, namely that few rural Swazis actually understand the cycle of bilharzia transmission.

Cholera

Cholera has only recently made an appearance in Southern Africa. One explanation of its cause offered by healers is that the disease is deliberately sent "through the air" by unscrupulous healers who wish to have more patients and build up their business.[1] About 26% of 50 traditional healers interviewed seemed to regard cholera as a type of diarrhea (umsheko) that can be treated by anti-diarrheal and/or spell-removing herbal medicines. The remaining 74% claimed they send cholera patients to clinics since they did not understand this new disease. Most healers were able to report that cholera is caused by drinking contaminated or unboiled water, but several indicated that they did not necessarily understand or believe this explanation.

Survey respondents provided the following answers to the question on the causes of cholera.

TABLE 41

WHAT CAUSES CHOLERA?

	Number of Respondents	Adjusted Frequency
Unboiled water	62	23.9
Dirty or stagnant water	47	18.2
Eating dirty or uncovered food	26	10.0
Flies or insects	26	10.0
Having no latrine	19	7.3
Unwashed or unripe fruit or vegetables	17	6.6
Not washing hands	16	6.2
Dirt, germs, or uncleanliness	16	6.2
Miscellaneous answers	30	11.6
No answer	191	
TOTAL	450	100.0%

[1] Explanations of this sort for cholera and smallpox are found elsewhere in Africa. See, for example, Imperato, P.J. and D. Traore, "Traditional Beliefs about Smallpox and its Treatment in the Republic of Mali," in Ademuwajun, Z.A., J. Ayode, I. Harrison, and D. Warren (eds.), African Therapeutic Systems, Waltham, Mass.: Crossroads Press, 1979, p. 15-18.

Miscellaneous answers in Table 41 included: eating something incompatible with your blood, inhaling air from infected areas, eating raw food, bad diet, "extension workers injecting our trees," buying non-Swazi food, unbalanced diet, home-brewed beer, carelessness in cooking, bile trouble, dirty environment, leaving baby bottle uncovered, and "it comes from foreign countries."

The non-response rate to this question, was 42.4%. Of the 259 who provided answers, 33% gave multiple answers, that is, those which fall into two or three categories. Examples of these are: unboiled water, no latrine, and not washing hands, or dirty water and flies bringing dirt to food. However, only the first given answer was counted for tabulation purposes.

Compared to the bilharzia question, there were more single and multiple correct answers for the cholera question. It would appear that cholera is better understood than bilharzia by rural Swazis, even though cholera is a new disease and bilharzia has been endemic for generations, and even though traditional healers refer cholera cases to clinics more readily than bilharzia cases. The difference is probably due to the greater fear associated with cholera and to the extraordinary health education efforts directed at cholera containment which began in 1981.

Infant Diarrhea

Diarrhea (umsheko) as a locally perceived disease category includes a variety of conditions ranging from the non-serious and naturally-caused, to the serious, even life-threatening condition brought on by sorcery or witchcraft. As noted above, cholera is often regarded as an extreme form of umsheko.

Simple cases of diarrhea are treated at home with a variety of herbal decoctions (timbita). Most persistent cases seem to be taken to traditional healers who also use various timbita and who usually provide a causal explanation for the diarrhea, thereby relieving a certain

amount of anxiety. Some mothers take their young children directly to a clinic if home remedies fail.

When respondents were asked about the causes of serious diarrhea which sometimes leads to a baby's death, there was again a high non-response rate (60.9%). There was also somewhat more evidence of traditional explanations, as indicated in the last four answer categories preceding "no answer" in the following table.

TABLE 42

WHAT CAUSES THE DIARRHEA WHICH KILLS BABIES?

	Number of Respondents	Adjusted Frequency
Bad food, bad diet	50	28.6
Flies	34	19.4
Dirty baby dishes	27	15.4
Dirty water	10	5.7
Evil spirits	9	5.1
Bad environment	6	3.4
Heat	5	2.9
Miscellaneous answers	34	19.4
No answer	275	
TOTAL	450	100.0%

Miscellaneous answers in Table 42 included: inhaling the air from herbal medicines, smoke in the stomach, contact with foreigners, appearance of baby's first teeth, withholding traditional protective medicines, failure to clean out baby's stomach (i.e. with traditional medicines), powdered milk, and white people in airplanes.

Major Health Problems

Respondents were asked to identify the major health problems in their homesteads. Some respondents may have interpreted the question to mean was there a major health problem in the homestead, because 8.9% (40) gave answers like: "nothing bad has happened yet." However, most understood the intent of the question although, consistent

with other answers in this section, traditional disease categories (e.g., umklwebho, likhubalo, tokholoshe) were seldom mentioned.

TABLE 43

MAJOR HEALTH PROBLEMS IN HOMESTEAD

	Number of Respondents	Adjusted Frequency
Stomach ache	87	19.3
Colds, flu, sore throat, malaria	52	11.6
Headache	42	9.3
Dirty water, lack of water	44	9.8
Lack of latrine	40	8.9
None, no problems yet	40	8.9
T.B., bronchitis, chest, etc.	39	8.7
Diarrhea, cholera	36	8.0
Clinic inaccessible or needed	8	1.8
Miscellaneous answers	62	13.8
TOTAL	450	100.0%

Miscellaneous answers to this question included: bad blood, dizziness, witches, "our babies cried until they died," umkhlwebho (sorcery disease), lack of food, toothache, "insults by our children," sores on babies, backaches, fits, rashes, kidney problems, blood pressure, rheumatism, and miscellaneous pains. Some answers, such as lack of latrine, may have been for the benefit of the interviewer since latrine construction was being actively promoted by extension workers from at least two ministries.

SECTION 7: ANALYSIS

In addition to basic frequency tabulations, the following statistical procedures were carried out for the survey data, using the Statistical Package for the Social Sciences (SPSS) computer program:

1. Cross-tabulations and tests of statistical significance for 9 predictor or independent variables and 20 dependent variables; also associations between predictor variables themselves.

2. Cross-tabulations of the predictor and dependent variables after the answers to the latter were divided into "right" and "wrong" responses. This "scoring" procedure yielded more meaningful associations than the general cross-tabulations mentioned above.

3. The computation of an overall score (grand mean) of all respondents for the 20 scored questions, then a comparison with the grand mean of subgroups possessing "indicator" characteristics. Each subgroup, for example those with no formal education or those living in a RHM-visited area, was then assigned a plus or minus percentage point score indicating how much better or worse than the grand mean the subgroup as a whole scored on all 20 questions.[1]

In the last mentioned procedure, a statistic known as eta is given to indicate the gross or unadjusted effect of the predictor on the dependent variable--or in this case on the 20 scorable questions. Eta-squared yields the correlation

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[1] This procedure was carried out by Multiple Classification analysis. For a discussion of the analytic procedure, see F. Andrews et al, Multiple Classification Analysis, Ann Arbor: Survey Research Center, Institute for Social Research, University of Michigan, 1969.

A degree of value judgment is involved in the designation of "right" and "wrong" answers to health KAP questions, as indeed in the selection and lumping together of the questions themselves. See Appendix for the answers designated as "right" and "wrong."

ratio, or the proportion of variation in the scorable questions explained by the predictor variable. For example, respondents in RHM-visited areas scored 4 percentage points higher than those in non-visited areas. Eta in this case is .16, which means that 2.6% (the square of eta) of variation is explained by the presumed influence of RHM's.

Of course, 2.6% of variation explained is small. Nevertheless, such measures are useful in baseline studies for comparison with future surveys. Furthermore, it is difficult to find strong associations between predictor and dependent variables in surveys of the present sort, and comparisons of the raw mean for a category with a grand mean provides a measure of variable association that might otherwise go unnoticed when relying only on the usual tests of significance. There is a danger, however, that more significance will be read into certain weak associations than is warranted. An eta of .16, for example, should not be construed to indicate that RHM's have a significant overall health KAP impact, even if RHM's do have a significant impact on certain specific practices (see below). The highest eta of any predictor variable in this survey was .27, which means that only 7% of variation in 20 dependent variables is explained. This caution should be kept in mind by policymakers who may wish to base decisions on results from this survey.

The strongest predictors, or influencing factors, turned out to be the highest level of education of any resident member of the homestead, the level of respondent's education, and region. To a lesser extent, sex of respondent, whether or not homesteads were in RDA areas, and whether or not Rural Health Motivators visited homesteads, had a determining effect.

Region

There were significant regional differences in responses to questions on boiling water, identifying the healthiest kinds of water, the causes of bilharzia, having a latrine

(see Section 4), and leaving chidlren's feces in the yard, as seen in the following tables.

TABLE 44

METHOD OF DISPOSING OF CHIDLREN'S FECES[1]

	HIGHVELD	MIDDLEVELD	LOWVELD	LUBOMBO PLATEAU
Correct Response[2]	47.7% (52)	37.9% (55)	30.7% (35)	20.5% (8)
Incorrect Response	52.3% (57)	62.1% (90)	69.3% (79)	79.5% (31)

Chi-square = 11.92 (3 degrees of freedom)
Significance = .008

TABLE 45

IDENTIFYING HEALTHIEST TYPE OF WATER, BY REGION

	HIGHVELD	MIDDLEVELD	LOWVELD	LUBOMBO PLATEAU
Correct Response	62.2% (74)	51.7% (78)	55.8% (72)	27.5% (11)
Incorrect Response	37.8% (45)	48.3% (73)	44.2% (57)	72.5% (29)

Chi-square = 14.96 (3 degrees of freedom)
Significance = .002

TABLE 46

BOILING DRINKING WATER, BY REGION

	HIGHVELD	MIDDLEVELD	LOWVELD	LUBOMBO PLATEAU
Sometimes or always boil	22% (27)	8% (12)	23% (28)	15% (6)
Never boil	78% (96)	92% (144)	77% (103)	85% (34)

Chi-square = 13.92 (3 degrees of freedom)
Significance = .003

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[1]Note that non-responses are not reflected in cross-tabulation tables.

[2]For "correct" responses, see Appendix 1.

TABLE 47

IDENTIFYING CAUSES OF BILHARZIA, BY REGION

	HIGHVELD	MIDDLEVELD	LOWVELD	LUBOMBO PLATEAU
Correct Response	41.7% (50)	46.3% (75)	37.8% (48)	48.7% (19)
Incorrect Response	58.3% (70)	53.7% (87)	62.2% (79)	51.3% (20)

Chi-square = 80.28 (3 degrees of freedom)
Significance = .001

Comparing overall regional scores with the grand mean, the Highveld averaged 3 percentage points above the mean, the Middleveld scored right at the grand mean (43%), the Lowveld was minus 2%, and Lubombo Plateau was minus 4% (eta = .13, correlation ratio = 2%).

Clearly, the Highveld emerges as the region with the highest percentage of correct responses as well as the best latrine coverage. It was only on the bilharzia question that the Highveld failed to score above the other regions, and this may be because bilharzia is less of a problem in the Highveld. The Middleveld generally scored slightly higher than the Lowveld, and the Lubombo Plateau scored lowest (and had the fewest latrines) of the four regions.

Why should there be regional differences in health knowledge and practices, or at least differences in responses to questions of this sort? First of all, differences may be related to factors which were measured in the present survey. For example, there were some regional differences in educational achievement. The percentage of those in the sample with no education is only 27.3% in the Highveld, but it rises to 35.9% in the Middleveld, 46.7% in the Lowveld, and 50.0% in the Lubombo region.[1] Secondly, there were

[1] In the 1976 Census, Lubombo district, comprising all of the Lubombo and much of the Lowveld regions, was found to have the smallest percentage of population attending school, compared to the other 3 districts. Central Statistical Office, op cit, p. 55.

more female respondents in the Highveld (see Section 2), and females scored an average of 2 percentage points higher than men on all questions. Thirdly, RHM's visited 50.4% of homesteads in the Highveld sample, compared to 33.8% in the Middleveld and 26.3% in the Lowveld. And homesteads visited by RHM's scored an average of 4 percentage points higher than non-visited homesteads, when all scorable answers are considered. However, 50.0% of homesteads in the Lubombo sample were visited by RHM's and scores were lowest in this region.

Fourthly, 65.6% of sampled homesteads in the Highveld are in "maximum input" rural development areas (RDA's)., compared to 44.9% in the Middleveld and 21.5% in the Lowveld. Homesteads scored an average of 1 percentage point higher in maximum RDA's than in non-RDA's; but once again, there is the anomoly of the Lubombo region, where 100% of sampled homesteads are in maximum RDA's. There must be other factors that help explain regional differences in health, knowledge and behavior.

In additon to the factors already discussed, the following may also explain regional differences in health knowledge, attitudes, and practices. Compared to the Lowveld and Lubombo regions, the Highveld and Middleveld: 1) enjoy somewhat higher levels of public health outreach; 2) have had more exposure to Swazi radio broadcasts on health education; 3) are influenced by Swaziland's two major urban centers in various ways; 4) may have higher literacy rates, in part because the Sebenta National Literacy Institute has worked longer in these areas.

Regional income differences, if they exist, would also help explain health KAP differences. However, no information on income was collected in the present survey. In his 1979 homestead survey, deVletter found no significant regional differences in income levels, except that the poorest regions in his sample were in southern Shisulweni.[1] The 1976 census

[1] deVletter, op cit, p. 67.

likewise found Shisulweni to have significantly less male and female full-time employment than the other three districts;[1] however, the geographic regions used in this survey cannot be meaningfully compared with the administrative regions used in the census. Further research on income differences is called for.

There were also sub-regional differences in responses, accounting for as much as 11 percentage points in answers to scorable questions. Sub-regional categories created by the Central Statistical Office were used in the survey. The sub-region number (see Table 48) either refers to northern, central or southern areas of a geographic area (if enumeration areas are in RDA's) or to the degree of population concentration within a region (if enumeration areas are not in RDA's). Thus, a sub-region is a cluster of enumeration areas that may or may not be contiguous.

Comparing overall scores of correct answers with the grand mean, the following table illustrates the resulting rank order of sub-regions.

TABLE 48

RELATIVE SCORES ON ALL QUESTIONS WITH RIGHT/WRONG ANSWERS, BY SUB-REGION

SUB-REGION	UNADJUSTED DEVIATION FROM GRAND MEAN	SUB-REGION	UNADJUSTED DEVIATION FROM GRAND MEAN
Highveld IV	+.06	Highveld II	-.01
Highveld III	+.05	Lowveld I	-.02
Middleveld IV	+.05	Lowveld II	-.02
Middleveld III	+.02	Lubombo I	-.04
Highveld I	+.01	Lubombo II	-.05
Middleveld I	.00		
Middleveld II	.00	eta = .18, correlation ratio = 3%	

There is an 11 percentage point difference between the highest and lowest scoring sub-regions, with only the Highveld and the Middleveld scoring above the grand mean. Such a breakdown of scores further indicate that health education messages are most needed in the Lowveld and Lubombo regions.

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[1] Central Statistical Office, op cit, p. 64.

Education

Two education variables were examined: the respondent's level of education, and the highest level attained by any resident in the homestead. The former will be considered first.

It should be noted first that age and level of formal education are inversely related: those with more education tend to be younger. This reflects the greatly expanded opportunities for education in recent years. Furthermore, there were no significant differences between the educational levels of male and female respondents, even though males may have had greater opportunities for schooling than females in the past. Males in the sample tended to be older than females (83% of the 144 male respondents were homestead heads) and this had a counter-balancing effect since older respondents tended to have had fewer years of education.

TABLE 49

RESPONDENT'S LEVEL OF FORMAL EDUCATION, BY AGE GROUP

Age Group	No Formal Education	Grade 1 - Standard 1	Standard 2- Standard 6	Above Form 1
<18-27	9.4% (17)	13.1% (8)	29.6% (42)	60.0% (39)
28-37	17.2% (31)	18.0% (11)	22.5% (32)	20.0% (13)
38-47	23.3% (42)	26.2% (16)	22.5% (32)	10.8% (7)
48-57	23.9% (43)	24.6% (15)	19.7% (28)	4.6% (3)
>57	26.1% (47)	18.0% (11)	5.7% (8)	4.6% (3)

Chi-square = 99.43 (12 degrees of freedom)
Significance = <.0001

Moreover, as we have already seen, respondents with higher education are likelier to own latrines and to live in the Highveld or Middleveld.

Level of formal education made a statistically significant difference in the answers to four knowledge and behavior questions regarding the causes of bilharzia, the healthiest types of water, the boiling of drinking water, and the type of container used to store water. As examples, the first two associations will be shown as tables.

TABLE 50

IDENTIFYING CAUSES OF BILHARZIA,

BY RESPONDENT'S LEVEL OF EDUCATION

	No Formal Education	Grade 1-Standard 1	Standard 2-Standard 6	Above Form 1
Correct Response	35.2% (62)	44.8% (26)	51.1% (71)	52.4% (33)
Incorrect Response	64.8% (114)	55.2% (32)	48.9% (68)	47.6% (30)

Chi-square = 10.134 (3 degrees of freedom)
Significance = .017

TABLE 51

IDENTIFYING HEALTHIEST KIND OF WATER,

BY RESPONDENT'S LEVEL OF EDUCATION

	No Formal Education	Grade 1-Standard 1	Standard 2-Standard 6	Above Form 1
Correct Response	48.0% (82)	49.2% (30)	57.1% (80)	64.6% (42)
Incorrect Response	52.0% (89)	50.8% (31)	42.9% (60)	35.4% (23)

Chi-square = 6.58 (3 degrees of freedom)
Significance = .088

Respondent's level of education was also associated with the practice of boiling drinking water (significance of x^2 = .04); and the type of container used to store drinking water (significance of x^2 = .02).

The second education variable, highest level of education of anyone in the homestead, also related significantly

to owning a latrine (see Section 4) and to the following knowledge/behavioral variables:[1] identifying the healthiest types of water (significance of x^2 = <.001), the method of cleaning the baby bottle (significance of x^2 = .031 (see Section 5), identifying the causes of bilharzia (significance of x^2 = .088), the kind of water used in baby formula (significance of x^2 = .066),[2] and the disposal of children's feces (significance of x^2 = .002).

TABLE 52

IDENTIFYING HEALTHIEST TYPES OF WATER,

BY HIGHEST LEVEL OF EDUCATION IN HOMESTEAD

	None	Grade 1 -Std. 1	Std. 2 -Std.6	Form 1 -Form 3	Form 4 -Form 5	College
Correct Response	45.5% (15)	68.4% (13)	37.2% (42)	56.3% (81)	63.4% (71)	80.0% (12)
Incorrect Response	54.5% (18)	31.6% (6)	62.8% (71)	43.8% (63)	36.6% (41)	20.0% (3)

Chi-square = 23.76 (5 degrees of freedom)
Significance = 0.0002

TABLE 53

IDENTIFYING CAUSES OF BILHARZIA,

BY HIGHEST LEVEL OF EDUCATION IN HOMESTEAD

	None	Grade 1 -Std. 1	Std. 2 -Std.6	Form 1 -Form 3	Form 4 -Form 5	College
Correct Response	21.2% (7)	33.3% (6)	44.7% (51)	48.6% (68)	45.2% (52)	53.3% (8)
Incorrect Response	78.8% (26)	66.7% (12)	55.3% (63)	51.4% (72)	54.8% (63)	46.7% (7)

Chi-square = 9.59 (5 degrees of freedom)
Significance = 0.088

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[1] Educational categories could be extended to higher levels for this variable since there were more people in the "Above Form 1" category.

[2] Since only 13 respondents gave the "incorrect" response to this question, the significance of this cross-tabulation is questionable.

TABLE 54

METHOD OF DISPOSING OF CHILDREN'S FECES,
BY HIGHEST LEVEL OF EDUCATION IN HOMESTEAD

	None	Grade 1 -Std. 2	Std. 2 -Std. 6	Form 1 -Form 3	Form 4 -Form 5	College
Correct Response	21.4% (6)	38.9% (7)	24.5% (25)	40.6% (54)	44.1% (49)	69.2% (9)
Incorrect Response	78.6% (22)	61.1% (11)	75.5% (77)	59.4% (79)	55.9% (62)	30.8% (4)

Chi-square = 18.72 (5 degrees of freedom)
Significance = 0.0022

An 18 percentage point difference is found in scored answers, depending on the highest level of education achieved in the homestead.

In the following table, the strength of the two education variables under consideration is compared, in terms of both their gross effects and their independent effects after adjustment for the interactive effects of the other education variables, sex of respondent, and the sub-region of the homestead.

TABLE 55

COMPARISON OF THE STRENGTH OF TWO EDUCATION VARIABLES

	RESPONDENT'S EDUCATION LEVEL			HIGHEST LEVEL OF EDUCATION IN HOMESTEAD		
	Number	Unadj. Devia. From Grand Mean	Deviation Adjusted for Other Independ Variables	Number	Unadj. Devia. From Grand Mean	Deviation Adjusted for Other Independ. Variables
No Education	178	-.03	-.02	34	-.08	-.08
Gr. 1 - Std. 1	60	-.01	0	19	-.04	-.02
Std. 2 - Std. 6	136	.02	.02	145	-.04	-.03
Form 1 - Form 3	46	.02	-.01	139	.03	.03
Form 4 - Form 5	15	.11	.09	116	.02	.01
Any College	3	.16	.11	15	.10	.07
		(eta = .23) (beta = .16) Correlation ratio = 5%			(eta = .27) (beta = .24) Correlation ratio = 7%	

Depending on the interactive effects of other independent variables, Fischer's F ratio for the effect of respondent's level of education varies between 2.83-4.67 (significance of F between .016-.001). Fischer's F ratio for the effects of the highest level of education in the homestead varies between 4.30-4.85 (significance of F between .000-.001), making this variable the strongest predictor measured in the survey.

It is possible that income or socioeconomic factors are related to the latter education variable: a homestead with at least one member who has achieved higher educational levels would tend to be a wealthier homestead, which in itself may influence answers positively. In any case, the results have implications for designing health education strategies.

Sex of Respondent

There were significant differences in responses depending on the sex of the respondent; however, these differences may not be due to sex alone. First, as noted above, there are regional differences in respondent's sex, with more females in the Highveld and Middleveld regions. Furthermore, female respondents tended to be younger than male respondents (significance of x^2 = .01). However, females were not significantly less educated than males, as already noted. Female respondents tended to be found on the larger homesteads (significance of x^2 = .07).

Females scored more correct answers than males on questions pertaining to disposal of children's feces, identifying healthiest types of water, and using a latrine for urination, as seen in the following tables.

TABLE 56

IDENTIFYING HEALTHIEST TYPES OF WATER,

BY SEX OF RESPONDENT

	Male	Female
Correct Response	45.1% (64)	57.9% (168)
Incorrect Response	54.9% (78)	42.1% (122)

Chi-square = 6.34 (1 degree of freedom)
Significance = .01

TABLE 57

DISPOSAL OF CHILDREN'S FECES,

BY RESPONDENT'S SEX

	Male	Female
Correct Response	27.4% (34)	40.6% (112)
Incorrect Response	72.6% (90)	59.4% (164)

Chi-square = 6.39 (1 degree of freedom)
Significance = 2.01

TABLE 58

USE OF LATRINE FOR URINATION,

BY RESPONDENT'S SEX

	Male	Female
Correct Response	32.0% (8)	54.2% (39)
Incorrect Response	68.0% (17)	45.8% (33)

Chi-square = 3.65 (1 degree of freedom)
Significance = .09

As noted in above sections, women are likelier than men to eat with their hands (significance of $x^2 = <.001$) and they tend to specify an earlier weaning age for babies than male respondents (significance of $x^2 = .01$).

When all scored answers are considered together, females scored an average of 2 percentage points higher than males (eta = .07). The difference would have been slightly greater had it not been for answers women gave to the questions on eating by hand (Swazi custom dictates that older men be given eating utensils before, or instead of, women) and age of weaning (males may have had a tendency to supply an answer based more on traditional norms than actual behavior). In any case, the somewhat better answers of female respondents

is not surprising: water, sanitation, hygiene, and certainly baby care, are considered by Swazis to be women's matters.

RHM Visits

As seen in Section 4, latrines are likelier to be found in areas visited by RHM's (significance of x^2 = .01). Moreover, respondents in such areas are likelier to give correct responses to the question of disposing of children's feces (significance of x^2 = .013), and they have a (statistically non-significant) greater tendency to boil water for themselves and for their babies. On the knowledge/behavioral questions, however, respondents in RHM areas scored no better, or even slightly worse (significantly worse on the cause of bilharzia question) than respondents in areas not visited by RHM's. Yet when all scored answers are considered together, respondents living in RHM-visited areas scored 4 percentage points higher than those in non-visited areas (eta = .16).[1]

It would seem that RHM's are beginning to have some impact. In the earlier but still recent evaluation of the RHM program, Prinz and Mndzebele[2] found no significant differences in health awareness or latrine coverage between RHM and non-RHM areas (using chi-square and related significance tests). The question may arise, however, whether the effects of RHM's in their communities are as great as might be expected.

In answer to this, it could be pointed out that RHM's were working in areas initially selected on the basis of need for health motivation, thus the areas tended to be somewhat behind in health awareness to begin with, compared to rural Swaziland as a whole. Any positive results, such as the greater latrine

[1] It was decided to discount the 33 respondents who answered "irregularly" or "don't know" to the question about RHM visits. It seems that respondents in both these categories may have been unable to distinguish between RHM's and other female extension workers.

[2] Prinz and Mndzebele, op cit, p. 122.

coverage found in RHM areas by this survey, should be viewed in this light. Furthermore, RHM's have not been working in these areas for very long (an average of 3.3 years at the time of the survey for the 8 RHM groups) and it may have been too soon to evaluate their effect, given the difficult areas of Swaziland where they were working.

Other Variables

Several additional significant associations were presented in earlier sections, such as that between owning a latrine and both size of homestead and RDA status. For some of the weaker predictor variables, looking at overall performance on the 20 scored questions provided a measure of their effects, even in the absence of statistically significant associations with particular dependent variables. For example, non-RDA areas had scores an average of 1% lower than maximum-input RDA areas. Confusing the issue slightly, however, was the finding that minimum-input RDA's scored 2% higher than non-RDA areas.

Although these differences are not significant, a factor in these findings may be that several RDA's classified as minimum-input were development areas during the colonial era, and thus have benefitted from development inputs for longer periods than certain maximum-input RDA's.[1]

Furthermore, as we saw in the sub-section on regional differences, Lubombo had the lowest scores of the four regions. Since all EA's in the Lubombo sample have been recently classified as maximum-input RDA's, overall scores for maximum-input RDA's would be pulled down, so to speak, by region.

It was interesting to discover statistically significant negative associations between head of homestead status and correct answers to several scorable questions, ie., identifying

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[1] F. Gaudin of the Ministry of Agriculture, personal communication, June, 1982.

the healthiest type of water (significance of x^2 = .09), disposal of children's feces (significance of x^2 = .0002), identifying causes of bilharzia (significance of x^2 = .098), method of cleaning baby bottle (significance of x^2 = .05). Furthermore, homestead heads were likelier to say they had no latrine because they did not want one or they did not know how to build one (significance of x^2 = .0002). Although the poor scores on questions relating to children or babies might be expected, and although homestead heads tend to be older, less educated males, the findings suggest that this group is greatly in need of health education, especially since they are the decision-makers in the homestead.

SECTION 8: SUMMARY AND RECOMMENDATIONS

Health Education Targets

Health-related knowledge, attitudes, and behavior in rural Swaziland vary depending on certain characteristics of the area, the homestead, or the respondent. With regard to the first, the Highveld was seen to have the highest KAP scores of four geographic regions, with scores declining from west to east. The sub-region with the highest KAP scores was a cluster of 4 enumeration areas in the Highveld, just south and east of Hlatikulu (Madulini, Sibhowe, Mangwaneni, Mahlaleni). The lowest KAP scores were found in a cluster of 4 enumeration areas in 3 named locations situated south and east of Siteki (Palata, Hhukwane, Lukhetseni). It would appear that health education efforts need to be directed especially to the Lowveld and Lubombo regions.

Homesteads that were in RDA areas and that were visited by Rural Health Motivators also tended to score very slightly higher on health KAP questions.

Educational differences, perhaps predictably, accounted for most of the variation in answers.[1] However, health knowledge, attitudes, and behavior were influenced slightly more by the highest educational level of any homestead member than by the respondent's own educational level, a finding that bears further investigation. The former

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[1] Education (of respondent) was found to be the strongest predictor of "attitudinal modernity" among South African Blacks in a recent study, cf. Thompson, J.C., and M. Tabane, "The Measurement of Modernization among South African Blacks: A Second Study." Johannesburg: National Institute for Personnel Research (Special Report), January 1980.

The consistent strength of this variable in a number of studies worldwide is discussed in Holsinger, Donald B. and Gary Theisen, "Education, Individual Modernity, and National Development: A Critical Appraisal." The Journal of Developing Areas, 11, April 1977, pp. 315-334.

education variable may be a proxy for income differences, which in turn may be strongly related to health KAP differences.

Other individual characteristics that accounted for KAP differences were sex, age, and homestead-head status. To draw a composite profile from these findings, a person most in need of health education (as well as a latrine) would be the male head of a small homestead situated in a non-RDA and non-RHM-visited area of the southern Lubombo region. Neither he nor anyone else in the homestead would have had any formal education. A person least in need of health education would be a younger, educated female living in a larger homestead, situated in an RHM-visited, RDA area of the Highveld.

The strategic question remains whether health education should be primarily directed at those most in need, when at the same time this group may be most resistant to behavior and attitude change. Or should efforts be directed toward those who have already exhibited behavior and attitude change and are presumably more receptive to health education?

Water and Behavior Change

To reduce the incidence of water-related diseases significantly, behavior change on a large scale is necessary. The survey has helped specify the necessary changes. To begin with, the complete avoidance of contaminated water would yield the most dramatic health benefits, and the boiling of all drinking water would perhaps be the single most desirable behavior change in this regard. However, health education alone may not overcome economic and other constraints to boiling (e.g., the fuel and time involved, or the "flat" taste of boiled water). On the other hand, there is evidence that health education can overcome these constraints when levels of concern or fear are high: most mothers appear now to boil water for their babies and some adults boil their own drinking water when they feel threatened by cholera.

The survey showed that many rural Swazis did not know "safe" from unsafe sources of drinking water. Clearly there is a need for intensified health education in this area. Moreover, many people are unaware or unconvinced of the health benefits of improved water supplies, regardless of availability. Intensified education in this area should lead to increased community initiative and participation in water improvement activities. It should also stimulate individuals to take initiatives such as constructing rainwater collection systems.

Lessened contact with water contaminated by bilharzia would reduce the incidence of that disease, but it is difficult to keep children from swimming in rivers and ponds; some Swazi parents have attempted this with little success. Through health education, people could be persuaded to limit their own, and their children's swimming and bathing times to the early morning and the late afternoon (the times of least cercariae activity), but again, children prefer to swim during the warmest time of the day, especially if it is winter. Furthermore, bilharzia seems to be a less well understood disease than cholera, and a disease of less local concern, making bilharzia a less fruitful topic for health education.

Sanitation and Behavior Change

Certain changes in sanitation would reduce the incidence not only of bilharzia, but also of the full range of fecal-oral diseases such as cholera, typhoid, and infant diarrhea. However, only 21% of rural Swazis have latrines, and even then children and old people may not use them. Furthermore, latrines don't seem to be used for urination by at least half of those who own them, and haematobium bilharzia is spread through the urine of bilharzia carriers, even when urination occurs only in the vicinity of water with which people have contact.

Given the manpower and financial resources of the Swaziland Government, as well as the current policy of promoting only cement-slab latrines, it seems unrealistic

to expect significant increases on the supply side of latrine construction. Indeed, with current rates of population increase, the percentage of homesteads with latrines may actually decrease over the next few years. It is recommended therefore, that Government begin to promote the construction of latrines made from locally available materials (see Section 4) such as poles or offcuts. Since most latrines in rural Swaziland are already of this sort, it would at least seem incumbent upon Government to ensure that such low cost latrines are as safe, durable, and hygienic as possible.

On the demand side of latrine construction, a shift toward non-concrete latrines would remove some of the financial, logistical, and other constraints, and demand could be expected to increase. However, other identified constraints would prevail and these can be weighed against the rather complex health education message that people will develop certain diseases if they excrete anywhere but in a latrine. In this regard, it appears that many rural people do not understand the processes whereby human and animal excreta is washed into bodies of water that serve as sources of drinking water. Intensified education in this area, involving appropriate visual aids, seems warranted.

If the contamination process were better understood, the importance of using latrines for both defecation and urination, and the need for all adults and children to use latrines would become more apparent. Specific educational strategies and materials need to be developed to teach mothers how to help their children under the age of 5 or 6 to use latrines. This may be accomplished by means of a simple, removable child's seat that fits over the hole used by adults.

For the three-quarters of rural Swazis who lack latrines, education needs to be directed at achieving the best excreta disposal under prevailing circumstances. Excretion should be as far away as possible from surface or other water that serves as a drinking source, and feces should be buried as deep as possible and then the hole

covered. People should understand that fecal contamination of water by animals is difficult to control. And mothers should be taught better disposal methods for the stools of babies and small children.

Hygiene, Infant Nutrition, and Behavior Change

It is hard to estimate the actual frequency of hand-washing from the survey results. However, any hygiene message should continue to stress the importance of hand-washing after excretion and before handling food, and washing should be done with soap. Bathing should be done more frequently and people should use water that has stood in a container for at least 24 hours to reduce the danger of bilharzia.

A message directed at women in particular should be that they abandon the practice of eating with their hands. Women should also be taught specific ways to protect food and water from flies and other sources of contamination. Some mothers already recognize contaminated food and water as major causes of infant diarrhea, but the 61% non-response rate to the survey question on infant diarrhea suggests that intensified health education in this area is needed. Since infant health and indeed survival is of utmost concern to mothers, significant behavior change in the area of food and water protection might be expected after intensified educational efforts.

Positive results of educational efforts are already evident in mothers' use of water in infant feeding and in the cleaning of feeding bottles. The health and other benefits of breast feeding and the hazards associated with bottle feeding should continue to be stressed, although education alone may not reverse the general trend away from breast feeding. Studies on prevalence and duration of breast feeding point to a worldwide decline in breast feeding that seems to be related to urbanization, the passing of traditionalism, the growth of employment opportunities, increased access

to commercial infant foods as well as their promotion and marketing, the rise in the nuclear family, and other factors associated with modern life.[1]

For working mothers who find it difficult to include breast feeding in their daily schedule, there need to be policy- or legally-backed opportunities for breast feeding during working hours through the establishment of work-breaks and daycare centers.[1]

Strategies for Health Education

There are special constraints to any sort of non-formal education and community mobilization in Swaziland. These constraints are probably to be found in varying degrees among all Nguni and eastern region southern Bantu groups[3] since they relate to ecological and economic adaptation, and a pattern of dispersed settlements as well as distinctive social and political structures.

In Swaziland, residential dispersement has resulted in a relative lack of community organization, and indeed in a lack of a strong sense of community at all. This can perhaps be best illustrated by contrasting Swaziland with a more nucleated, village-based area of southern Africa. For example, in northern Malawi/southern Tanzania, a widely held value expresses the idea that people can only become wise and healthy through close and constant association with other people.[4] Swazis on the other hand tend to believe

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[1] See for example WHO, Contemporary Patterns of Breast-Feeding: Report of the WHO Collaborative Study on Breast-Feeding. Geneva, 1981.

[2] See recommendations in: WHO, Infant and Young Child Feeding: Current Issues, Geneva, 1981.

[3] For economic characterization of these groups, see Basil Sansom, Traditional Economic Systems, in W.D. Hammond-Tooke (ed.), The Bantu-Speaking Peoples of Southern Africa, London: Routledge and Kegan Paul, 1974, pp. 135-176.

[4] cf. Monica Wilson, Good Company, A Study of Nyakyusa age-Villages. Boston: Beacon Press, 1963, pp. 46-7. (Also John Nyirenda (health educator), personal communication, July, 1982).

that close contact with people may result in such consequences as contagious disease (tifo temoya) and sorcery attacks, leading to the conclusion that people are better off living separately from others. Thus we find in Swaziland a pattern of relatively isolated, autonomous family groups with relatively little sense of responsibility beyond the extended family groups. This makes mobilizing communities for specific health objectives or promoting local health committees especially difficult.

However, rural Swazi communities seem to differ considerably in their degree of organization and willingness to participate in community-wide projects. The leadership and other qualities of the chief or sub-chief is certainly an important factor. Economic, educational, kinship, and historical factors may be relevant as well, but more research in this area is needed before conclusions can be reached.

The traditional Swazi socio-political structure of powerful chiefs, aristocratic kin-groups and centralized or top-down planning is also an important factor to consider in designing health education strategies. For example at the local level, members of health or development committees are not democratically elected; they are appointed by the chief. Likewise, initiative for change usually comes from hereditary leaders or their families, rather than from the governed. Thus any approach based on participatory planning, local initiative, or self-help may require revision in Swaziland.

There are other factors influencing the organization of rural African populations in general, that add to our understanding of Swaziland (but are by no means unique to Swaziland). To mention only two:[1]

[1] These are taken in paraphrased form from Isely, et al, "Community Organization as an Approach to Health Education in Rural Africa," International Journal of Health Education, XXII-3, 1979.

-- the exodus from rural areas of much of the active segment of the population, due to wage laboring. This has drained talent from rural areas and left behind a population that is becoming increasingly dependent--elderly or very young, and mostly female.

-- the centralization of power in both public and private sectors, which has left rural people with a sense of powerlessness to deal with their problems.

Thus, we find a situation in rural Africa in general, and in rural Swaziland in particular, which makes community-based health education a rather obstacle strewn course to pursue. However, there are other approaches that may circumvent some of these obstacles.

For example, Swaziland Broadcasting Services now transmits to all parts of the country, and a working radio is present in the great majority of homesteads. It seems likely that radio could become an even more powerful medium of health education than it has already proven to be. There is no doubt that radio can transmit messages quickly throughout Swaziland. Following the death of King Sobhuza II, certain traditional mourning practices were announced, and within a day or two it seems that the message had penetrated even the remotest areas--largely by radio. A radio campaign with a simple message, such as how to prepare and use oral rehydration salts, could be effective in preventing deaths from cholera, especially since the idea of drinking a mixture of medicinal powder and water is already familiar in traditional medicine.

Nurses and extension workers play a vital role in health education and their effectiveness can be enhanced through better coordination of efforts with extension workers from other ministries, as well as with others within the health ministry. And certainly effectiveness can be enhanced through enlistment of support of traditional healers and local chiefs, since they enjoy considerable influence and authority in their communities.

There are indications that a great deal of health education can, and has, occurred in the schools. Seminars and workshops for headmasters and teachers organized by the Health Education Unit (HEU) have made an important contribution in this regard,

and such activities should be further promoted and expanded. The current revision of school curriculum and development of new reading materials by the Primary Curriculum Unit of the Ministry of Education should also contribute substantially to health education. Finally, the School Health Team, consisting of public health nurses, can be used in health education campaigns and even in routine information dissemination.

Another approach to health education is through audio visual aids, and these could be made more effective through careful pre-testing in the field. A number of locally used visual aids were designed by non-Swazis, and feedback from extension workers has indicated that the messages are not always conveyed as intended.

Lastly, the potential of local health committees could possibly be realized if the committees could be formed in such a way that they genuinely represent their communities.

Unfortunately, the current size of the HEU's professional staff-especially its de facto size while staff members are undergoing overseas training--is currently so small that it will be difficult to implement some of the above recommendations.

A General Approach to Health Education

A few general points about health education, based on an understanding of Swazi culture, can be made. First, even though rural Swazis lack a germ theory of disease, there are many traditional concepts of health and disease that can be built upon for purposes of health education. Interviews with traditional healers yielded information of this sort. For example, Swazis believe that unseen agents can cause disease. Some diseases are thought to be "in the air" (tifo temoya) and highly contagious; people are "infected" by breathing unseen agents into their bodies. Swazis believe in other environmental dangers as well: poisons and spells may make certain places unsafe, and some diseases may be contracted by simply walking past a location where traditional medicines have been mixed if the area has not subsequently been purified.

Practices relating to disease prevention are also widespread. For example, certain medicines (tinyamatane) are routinely given to children through inhalation or traditional vaccination to protect them against a variety of supernatural dangers, and entire homesteads are protected from certain supernatural attacks by driving ritually-prepared pegs or nails into the ground (kubetsela = to prevent, or to drive a nail) around the perimeter of the homestead.

And as a final example, traditional Swazis recognize that people can be asymptomatic carriers of a disease. Women, for example, are said to transmit likhubalo--a disease that can be fatal in men--without being affected by it themselves.

Health education messages could be designed to accommodate certain traditional health beliefs without sacrificing public health objectives. For example, traditional mothers might be more receptive to having their children vaccinated against childhood diseases if the practice were presented as an improved form of tinyamatane. The point is that to ignore traditional health beliefs is to avoid reality; to challenge or confront them directly is to create stress, confusion, and resentment among traditional people.

As a second general point, the KAP survey and related research suggests that the concerns of rural Swazis are hierarchically arranged and are related directly to widely shared values. Cholera, for example, is of greater concern than bilharzia because it is directly life-threatening. Anything that threatens the life of a child or infant is likewise of utmost concern, since children are highly valued and a Swazi woman's role is validated in large measure by her ability to bear and raise healthy children. Similarly, there is greater concern for mere access to water than for access to safe water, since the health benefits of the latter are imperfectly understood and access to any kind of water pays considerable convenience dividends.[1] And there is greater

[1] It must be remembered that regardless of quality, increased quantity of water leads to disease reduction, at least in arid, rural areas. See for example Bradley, David J. "Water Supplies--the Consequence of Change" in Human Rights in Health (CIBA Foundation Symposium No. 23, new series). K. Elliot and J. Knight (eds.), N.Y. and London: Associated Scientific Publishers, 1974.

concern for the cleanliness of one's hut and homestead than for the area just outside one's homestead (where human waste and rubbish may be thrown) because a woman's responsibility and reputation are related chiefly to the former.

Excreta disposal, not surprisingly, is among the lower ranked concerns of rural Swazis; in fact, use of a latrine to some extent conflicts with traditional values of female modesty and in-law respect/avoidance--not to mention the fear of sorcery associated with bodily wastes.

Health education in Swaziland should effectively link higher and lower concerns or objectives so that the achievement of one goal is shown to be dependent upon the achievement of another. For example, the health and survival of babies and adults can be shown to be dependent upon access to uncontaminated water and food, which in turn is dependent upon proper excreta disposal, the protection of food and general homestead and personal cleanliness.

Recent behavioral changes measured in this survey, such as the boiling of water in cholera areas and for babies regardless of area, seem to provide a key to the problem: health education can lead to rapid and significant changes when people are receptive, and people are receptive when their serious concerns are addressed. The task of water and sanitation education is therefore to identify public health objectives with the relevant concerns of rural Swazis and of particular sub-groups. The recent outbreak of cholera should provide added impetus to such an approach.

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APPENDIX

Scored Questions used for Comparison with the Grand Mean

Q. 12. Which kind of water do you think is healthiest?

"Right Answers":

enclosed, protected spring
standpipe or tap
borehole or well
rainwater

"Wrong Answers":

unprotected spring
spring, protected from cattle, goats, etc.
river or stream
dam or stagnant pool
other

Q. 13. Which kind of water do you think is not healthy?

"Right Answers":

river or stream
dam or stagnant pool
unprotected spring

"Wrong Answers":

spring, protected from cattle, goats, etc.
enclosed, protected spring
standpipe or tap
borehole or well
rainwater
other

Q. 15. In what kind of container is drinking water fetched for the homestead?

"Right Answers":

closed 20-litre plastic container
other closed container

"Wrong Answers":

uncovered bucket or container
covered bucket
clay pot
other, please specify

Q. 17. In what kind of container is water generally stored in your home?

"Right Answers":

covered bucket
closed 20-litre plastic container
clay pot, covered

"Wrong Answers":

uncovered bucket or container
other containers or drums
clay pot, uncovered
other, please specify

Q. 24. Do you boil your drinking water?

"Right Answers":

yes, only recently because of cholera threat
yes, only if babies are threatened by cholera
sometimes, depending on convenience
sometimes, when water looks dirty or tastes bad
for babies only, always
usually, except when inconvenient
yes, always

"Wrong Answers":

no, never
other, please specify

Q. 25. Do you have a latrine (or more than one latrine)?

"Right Answers":

yes
have 2 or more latrines
latrine not functioning
latrine not finished yet

"Wrong Answers":

no

Q. 39. Do all members of your homestead share the same latrine(s)?

"Right Answers":

yes

"Wrong Answers":

no
males and females use separate latrines
adults and children use separate latrines
children don't use latrine
some elders don't use latrine
other
not applicable

Q. 41. Is your latrine(s) used for passing water?

"Right Answers":

yes

"Wrong Answers":

no
sometimes but not always
mostly by women
mostly by men
other, please specify
not applicable

Q. 42. At what age do children in your homestead start using the latrine.

"Right Answers":

from earliest age
about 1 year
about 2 years
about 3 years

"Wrong Answers":

about 4 years
about 5 years
about 6 years
more than 7 years
children don't use
not applicable

Q. 43. Where do children of your homestead generally pass water?

"Right Answers":

in latrine

"Wrong Answers":

in open
depends, can't say
not applicable

Q. 45. Do you wash your hands after going to the latrine?

"Right Answers":

yes
only after defecation

"Wrong Answers":

no
only if water if available
sometimes (unspecified)

Q. 47. If children do not use a latrine, how are stools disposed of?

"Right Answers":

thrown in latrine
thrown in hole
thrown in hole and covered

"Wrong Answers":

left alone
thrown in bush
other, please specify
other, not applicable, don't know

Q. 48. If you have no latrine, what is the reason?

"Right Answers":

not applicable -- have latrine
don't have the material or money
we want to have it
don't have the transport
plan to move or be relocated
don't have anyone to dig the pit
other, please specify

"Wrong Answers":

don't know how to build it
don't want it

Q. 52. Do you eat with your hands?

"Right Answers":

no

"Wrong Answers":

yes
sometimes

Q. 59. Is the baby/babies present in homestead breast-fed?

"Right Answers":

yes

"Wrong Answers":

no
not all babies
sometimes
not applicable

Q. 60. On what do you feed the baby or babies?

"Right Answers":

not fed by other than breast

"Wrong Answers":

bottle
cup
bottle and cup
breast and bottle or cup
not applicable
other means, please specify

Q. 61. If water is used in baby formula, cow's milk or other food, or to dilute milk, is the water:

"Right Answers":

boiled
unboiled but from tap, borehole, protected springs, or other protected source

"Wrong Answers":

unboiled
can't say
not applicable

Q. 62. At what age do babies usually stop being breast-fed (to nearest month)?

"Right Answers":

20-23 months
24-27 months
more than 28 months

"Wrong Answers":

0-3 months
4-7 months
8-11 months
12-15 months
16-19 months
can't answer; depends on the person breast-feeding
not applicable

Q. 63. If baby bottle used, is it cleaned (if so, then how cleaned)?

"Right Answers":

with boiled water
with soap and boiled water

"Wrong Answers":

not cleaned
rinsed out only
with soap
with soap and unboiled water
with brush and water
with brush, soap, and water
don't know
other, not applicable

Q. 66. What causes bilharzia?

"Right Answers":

contact with dirty or stagnant water through swimming or washing
water with small animals, worms, or tadpoles
snails
lack of latrine or urinating in water

"Wrong Answers":

don't know /no answer
drinking dirty or unboiled water
flies, mosquitoes or other insects
witchcraft or sorcerers
miscellaneous